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(54) Title: METHOD AND REAGENT FOR THE TREATMENT OF DISEASES OR CONDITIONS RELATED TO LEVELS OF VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR

(57) Abstract

Nucleic acid molecule which modulates the synthesis, expression and/or stability of an mRNA encoding one or more receptors of vascular endothelial growth factor.

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DESCRIPTIONMethod and Reagent for the Treatment of Diseases or
Conditions Related to Levels of Vascular Endothelial
Growth Factor ReceptorBackground Of The Invention

This application is a continuation-in-part of Pavco et al., U.S. Serial No. 60/005,974 all of which is hereby incorporated by reference herein (including drawings).

5 This invention relates to methods and reagents for the treatment of diseases or conditions relating to the levels of expression of vascular endothelial growth factor (VEGF) receptor(s).

The following is a discussion of relevant art, none 10 of which is admitted to be prior art to the present invention.

VEGF, also referred to as vascular permeability factor (VPF) and vasculotropin, is a potent and highly specific mitogen of vascular endothelial cells (for a 15 review see Ferrara, 1993 *Trends Cardiovas. Med.* 3, 244; Neufeld et al., 1994 *Prog. Growth Factor Res.* 5, 89). VEGF induced neovascularization is implicated in various pathological conditions such as tumor angiogenesis, proliferative diabetic retinopathy, hypoxia-induced 20 angiogenesis, rheumatoid arthritis, psoriasis, wound healing and others.

VEGF, an endothelial cell-specific mitogen, is a 34-45 kDa glycoprotein with a wide range of activities that include promotion of angiogenesis, enhancement of 25 vascular-permeability and others. VEGF belongs to the platelet-derived growth factor (PDGF) family of growth factors with approximately 18% homology with the A and B chain of PDGF at the amino acid level. Additionally, VEGF contains the eight conserved cysteine residues common to 30 all growth factors belonging to the PDGF family (Neufeld et al., *supra*). VEGF protein is believed to exist

predominantly as disulfide-linked homodimers; monomers of VEGF have been shown to be inactive (Plouet et al., 1989 *EMBO J.* 8, 3801).

VEGF exerts its influence on vascular endothelial cells by binding to specific high-affinity cell surface receptors. Covalent cross-linking experiments with ¹²⁵I-labeled VEGF protein have led to the identification of three high molecular weight complexes of 225, 195 and 175 kDa presumed to be VEGF and VEGF receptor complexes (Vaisman et al., 1990 *J. Biol. Chem.* 265, 19461). Based on these studies VEGF-specific receptors of 180, 150 and 130 kDa molecular mass were predicted. In endothelial cells, receptors of 150 and the 130 kDa have been identified. The VEGF receptors belong to the superfamily of receptor tyrosine kinases (RTKs) characterized by a conserved cytoplasmic catalytic kinase domain and a hydrophylic kinase sequence. The extracellular domains of the VEGF receptors consist of seven immunoglobulin-like domains that are thought to be involved in VEGF binding functions.

The two most abundant and high-affinity receptors of VEGF are flt-1 (fms-like tyrosine kinase) cloned by Shibuya et al., 1990 *Oncogene* 5, 519 and KDR (kinase-insert-domain-containing receptor) cloned by Terman et al., 1991 *Oncogene* 6, 1677. The murine homolog of KDR, cloned by Mathews et al., 1991, *Proc. Natl. Acad. Sci., USA*, 88, 9026, shares 85% amino acid homology with KDR and is termed as flk-1 (fetal liver kinase-1). Recently it has been shown that the high-affinity binding of VEGF to its receptors is modulated by cell surface-associated heparin and heparin-like molecules (Gitay-Goren et al., 1992 *J. Biol. Chem.* 267, 6093).

VEGF expression has been associated with several pathological states such as tumor angiogenesis, several forms of blindness, rheumatoid arthritis, psoriasis and others. Following is a brief summary of evidence supporting the involvement of VEGF in various diseases:

1) Tumor angiogenesis: Increased levels of VEGF gene expression have been reported in vascularized and edema-associated brain tumors (Berkman et al., 1993 *J. Clin. Invest.* 91, 153). A more direct demonstration of the role 5 of VEGF in tumor angiogenesis was demonstrated by Jim Kim et al., 1993 *Nature* 362, 841 wherein, monoclonal antibodies against VEGF were successfully used to inhibit the growth of rhabdomyosarcoma, glioblastoma multiforme cells in nude mice. Similarly, expression of a dominant negative 10 mutated form of the flt-1 VEGF receptor inhibits vascularization induced by human glioblastoma cells in nude mice (Millauer et al., 1994, *Nature* 367, 576).

2) Ocular diseases: Aiello et al., 1994 *New Engl. J. Med.* 331, 1480, showed that the ocular fluid, of a majority 15 of patients suffering from diabetic retinopathy and other retinal disorders, contains a high concentration of VEGF. Miller et al., 1994 *Am. J. Pathol.* 145, 574, reported elevated levels of VEGF mRNA in patients suffering from retinal ischemia. These observations support a 20 direct role for VEGF in ocular diseases.

3) Psoriasis: Detmar et al., 1994 *J. Exp. Med.* 180, 1141 reported that VEGF and its receptors were over-expressed in psoriatic skin and psoriatic dermal micro-vessels, suggesting that VEGF plays a significant role in 25 psoriasis.

4) Rheumatoid arthritis: Immunohistochemistry and *in situ* hybridization studies on tissues from the joints of patients suffering from rheumatoid arthritis show an increased level of VEGF and its receptors (Fava et al., 30 1994 *J. Exp. Med.* 180, 341). Additionally, Koch et al., 1994 *J. Immunol.* 152, 4149, found that VEGF-specific antibodies were able to significantly reduce the mitogenic activity of synovial tissues from patients suffering from rheumatoid arthritis. These observations support a direct 35 role for VEGF in rheumatoid arthritis.

In addition to the above data on pathological conditions involving excessive angiogenesis, a number of

studies have demonstrated that VEGF is both necessary and sufficient for neovascularization. Takashita et al., 1995 *J. Clin. Invest.* 93, 662, demonstrated that a single injection of VEGF augmented collateral vessel development 5 in a rabbit model of ischemia. VEGF also can induce neovascularization when injected into the cornea. Expression of the VEGF gene in CHO cells is sufficient to confer tumorigenic potential to the cells. Kim et al., *supra* and Millauer et al., *supra* used monoclonal antibodies against 10 VEGF or a dominant negative form of flk-1 receptor to inhibit tumor-induced neovascularization.

During development, VEGF and its receptors are associated with regions of new vascular growth (Millauer et al., 1993 *Cell* 72, 835; Shalaby et al., 1993 *J. Clin. Invest.* 91, 2235). Furthermore, transgenic mice lacking either of the VEGF receptors are defective in blood vessel formation, infact these mouse do not survive; flk-1 appears to be required for differentiation of endothelial cells, while flt-1 appears to be required at later stages 20 of vessel formation (Shalaby et al., 1995 *Nature* 376, 62; Fung et al., 1995 *Nature* 376, 66). Thus, these receptors must be present to properly signal endothelial cells or their precursors to respond to vascularization-promoting stimuli.

25 All of the conditions listed above, involve extensive vascularization. This hyper-stimulation of endothelial cells may be alleviated by VEGF antagonists. Thus most of the therapeutic efforts for the above conditions have concentrated on finding inhibitors of the VEGF protein.

30 Kim et al., 1993 *Nature* 362, 841 have been successful in inhibiting VEGF-induced tumor growth and angiogenesis in nude mice by treating the mice with VEGF-specific monoclonal antibody.

Koch et al., 1994 *J. Immunol.* 152, 4149 showed that 35 the mitogenic activity of microvascular endothelial cells found in rheumatoid arthritis (RA) synovial tissue explants and the chemotactic property of endothelial cells

from RA synovial fluid can be neutralized significantly by treatment with VEGF-specific antibodies.

Ullrich et al., International PCT Publication No. WO 94/11499 and Millauer et al., 1994 *Nature* 367, 576 used a soluble form of flk-1 receptor (dominant-negative mutant) to prevent VEGF-mediated tumor angiogenesis in immuno-deficient mice.

Kendall and Thomas, International PCT Publication No. WO 94/21679 describe the use of naturally occurring or recombinantly-engineered soluble forms of VEGF receptors to inhibit VEGF activity.

Robinson, International PCT Publication No. WO 95/04142 describes the use of antisense oligonucleotides targeted against VEGF RNA to inhibit VEGF expression.

Jellinek et al., 1994 *Biochemistry* 33, 10450 describe the use of VEGF-specific high-affinity RNA aptamers to inhibit the binding of VEGF to its receptors.

Rockwell and Goldstein, International PCT Publication No. WO 95/21868, describe the use of anti-VEGF receptor monoclonal antibodies to neutralize the effect of VEGF on endothelial cells.

Summary Of The Invention

The invention features novel nucleic acid-based techniques [e.g., enzymatic nucleic acid molecules (ribozymes), antisense nucleic acids, 2-5A antisense chimeras, triplex DNA, antisense nucleic acids containing RNA cleaving chemical groups (Cook et al., U.S. Patent 5,359,051)] and methods for their use to down regulate or inhibit the expression of receptors of VEGF (VEGF-R).

In a preferred embodiment, the invention features use of one or more of the nucleic acid-based techniques to inhibit the expression of flt-1 and/or flk-1/KDR receptors.

By "inhibit" it is meant that the activity of VEGF-R or level of mRNAs or equivalent RNAs encoding VEGF-R is reduced below that observed in the absence of the nucleic acid. In one embodiment, inhibition with ribozymes

preferably is below that level observed in the presence of an enzymatically inactive RNA molecule that is able to bind to the same site on the mRNA, but is unable to cleave that RNA. In another embodiment, inhibition with anti-sense oligonucleotides is preferably below that level observed in the presence of for example, an oligonucleotide with scrambled sequence or with mismatches.

By "enzymatic nucleic acid molecule" it is meant an RNA molecule which has complementarity in a substrate binding region to a specified gene target, and also has an enzymatic activity which is active to specifically cleave target RNA. That is, the enzymatic RNA molecule is able to intermolecularly cleave RNA and thereby inactivate a target RNA molecule. This complementary regions allow sufficient hybridization of the enzymatic RNA molecule to the target RNA and thus permit cleavage. One hundred percent complementarity is preferred, but complementarity as low as 50-75% may also be useful in this invention. By "equivalent" RNA to VEGF-R is meant to include those naturally occurring RNA molecules in various animals, including human, mice, rats, rabbits, primates and pigs.

By "antisense nucleic acid" it is meant a non-enzymatic nucleic acid molecule that binds to target RNA by means of RNA-RNA or RNA-DNA or RNA-PNA (protein nucleic acid; Egholm et al., 1993 *Nature* 365, 566) interactions and alters the activity of the target RNA (for a review see Stein and Cheng, 1993 *Science* 261, 1004).

By "2'-5'A antisense chimera" it is meant, an antisense oligonucleotide containing a 5' phosphorylated 2'-5'-linked adenylate residues. These chimeras bind to target RNA in a sequence-specific manner and activate a cellular 2-5A-dependent ribonuclease which, in turn, cleaves the target RNA (Torrence et al., 1993 *Proc. Natl. Acad. Sci. USA* 90, 1300).

By "triplex DNA" it is meant an oligonucleotide that can bind to a double-stranded DNA in a sequence-specific manner to form a triple-strand helix. Formation of such

triple helix structure has been shown to inhibit transcription of the targeted gene (Duval-Valentin et al., 1992 Proc. Natl. Acad. Sci. USA 89, 504).

By "gene" it is meant a nucleic acid that encodes an 5 RNA.

By "complementarity" it is meant a nucleic acid that can form hydrogen bond(s) with other RNA sequence by either traditional Watson-Crick or other non-traditional types (for example, Hoogsteen type) of base-paired 10 interactions.

Six basic varieties of naturally-occurring enzymatic RNAs are known presently. Each can catalyze the hydrolysis of RNA phosphodiester bonds in *trans* (and thus can cleave other RNA molecules) under physiological conditions. Table I summarizes some of the characteristics of these ribozymes. In general, enzymatic nucleic acids act by first binding to a target RNA. Such binding occurs through the target binding portion of a enzymatic nucleic acid which is held in close proximity to an enzymatic 20 portion of the molecule that acts to cleave the target RNA. Thus, the enzymatic nucleic acid first recognizes and then binds a target RNA through complementary base-pairing, and once bound to the correct site, acts enzymatically to cut the target RNA. Strategic cleavage 25 of such a target RNA will destroy its ability to direct synthesis of an encoded protein. After an enzymatic nucleic acid has bound and cleaved its RNA target, it is released from that RNA to search for another target and can repeatedly bind and cleave new targets. Thus, a 30 single ribozyme molecule is able to cleave many molecules of target RNA. In addition, the ribozyme is a highly specific inhibitor of gene expression, with the specificity of inhibition depending not only on the base-pairing mechanism of binding to the target RNA, but also on the 35 mechanism of target RNA cleavage. Single mismatches, or base-substitutions, near the site of cleavage can completely eliminate catalytic activity of a ribozyme.

Ribozymes that cleave the specified sites in VEGF-R mRNAs represent a novel therapeutic approach to treat tumor angiogenesis, ocular diseases, rheumatoid arthritis, psoriasis and others. Applicant indicates that ribozymes
5 are able to inhibit the activity of VEGF-R (specifically flt-1 and flk-1/KDR) and that the catalytic activity of the ribozymes is required for their inhibitory effect. Those of ordinary skill in the art will find that it is
10 clear from the examples described that other ribozymes that cleave VEGF-R mRNAs may be readily designed and are within the invention.

In preferred embodiments of this invention, the enzymatic nucleic acid molecule is formed in a hammerhead or hairpin motif, but may also be formed in the motif of
15 a hepatitis delta virus, group I intron or RNaseP RNA (in association with an RNA guide sequence) or *Neurospora* VS RNA. Examples of such hammerhead motifs are described by Rossi et al., 1992, *AIDS Research and Human Retroviruses* 8, 183, of hairpin motifs by Hampel et al., EP0360257,
20 Hampel and Tritz, 1989 *Biochemistry* 28, 4929, and Hampel et al., 1990 *Nucleic Acids Res.* 18, 299, and an example of the hepatitis delta virus motif is described by Perrotta and Been, 1992 *Biochemistry* 31, 16; of the RNaseP motif by Guerrier-Takada et al., 1983 *Cell* 35, 849, *Neurospora* VS
25 RNA ribozyme motif is described by Collins (Saville and Collins, 1990 *Cell* 61, 685-696; Saville and Collins, 1991 *Proc. Natl. Acad. Sci. USA* 88, 8826-8830; Collins and Olive, 1993 *Biochemistry* 32, 2795-2799) and of the Group I intron by Cech et al., U.S. Patent 4,987,071. These
30 specific motifs are not limiting in the invention and those skilled in the art will recognize that all that is important in an enzymatic nucleic acid molecule of this invention is that it has a specific substrate binding site which is complementary to one or more of the target gene
35 RNA regions, and that it have nucleotide sequences within or surrounding that substrate binding site which impart an RNA cleaving activity to the molecule.

In a preferred embodiment the invention provides a method for producing a class of enzymatic cleaving agents which exhibit a high degree of specificity for the RNA of a desired target. The enzymatic nucleic acid molecule is 5 preferably targeted to a highly conserved sequence region of target mRNAs encoding VEGF-R proteins (specifically flt-1 and flk-1/KDR) such that specific treatment of a disease or condition can be provided with either one or several enzymatic nucleic acids. Such enzymatic nucleic 10 acid molecules can be delivered exogenously to specific tissue or cellular targets as required. Alternatively, the ribozymes can be expressed from DNA and/or RNA vectors that are delivered to specific cells.

Synthesis of nucleic acids greater than 100 nucleotides in length is difficult using automated methods, and the therapeutic cost of such molecules is prohibitive. In this invention, small nucleic acid motifs (e.g., antisense oligonucleotides, hammerhead or the hairpin ribozymes) are used for exogenous delivery. The simple structure of 20 these molecules increases the ability of the nucleic acid to invade targeted regions of the mRNA structure. However, these nucleic acid molecules can also be expressed within cells from eukaryotic promoters (e.g., Izant and Weintraub, 1985 *Science* 229, 345; McGarry and 25 Lindquist, 1986 *Proc. Natl. Acad. Sci. USA* 83, 399; Sullenger-Scanlon et al., 1991, *Proc. Natl. Acad. Sci. USA*, 88, 10591-5; Kashani-Sabet et al., 1992 *Antisense Res. Dev.*, 2, 3-15; Dropulic et al., 1992 *J. Virol.*, 66, 1432-41; Weerasinghe et al., 1991 *J. Virol.*, 65, 5531-4; 30 Ojwang et al., 1992 *Proc. Natl. Acad. Sci. USA* 89, 10802-6; Chen et al., 1992 *Nucleic Acids Res.*, 20, 4581-9; Sarver et al., 1990 *Science* 247, 1222-1225; Thompson et al., 1995 *Nucleic Acids Res.* 23, 2259). Those skilled in 35 the art realize that any nucleic acid can be expressed in eukaryotic cells from the appropriate DNA/RNA vector. The activity of such nucleic acids can be augmented by their release from the primary transcript by a ribozyme (Draper

et al., PCT WO93/23569, and Sullivan et al., PCT WO94/02595, both hereby incorporated in their totality by reference herein; Ohkawa et al., 1992 Nucleic Acids Symp. Ser., 27, 15-6; Taira et al., 1991, Nucleic Acids Res., 19, 5125-30; Ventura et al., 1993 Nucleic Acids Res., 21, 3249-55; Chowrira et al., 1994 J. Biol. Chem. 269, 25856).

Such nucleic acids are useful for the prevention of the diseases and conditions discussed above, and any other diseases or conditions that are related to the levels of VEGF-R (specifically flt-1 and flk-1/KDR) in a cell or tissue.

By "related" is meant that the reduction of VEGF-R (specifically flt-1 and flk-1/KDR) RNA levels and thus reduction in the level of the respective protein will relieve, to some extent, the symptoms of the disease or condition.

Ribozymes are added directly, or can be complexed with cationic lipids, packaged within liposomes, or otherwise delivered to target cells or tissues. The nucleic acid or nucleic acid complexes can be locally administered to relevant tissues ex vivo, or in vivo through injection, infusion pump or stent, with or without their incorporation in biopolymers. In preferred embodiments, the ribozymes have binding arms which are complementary to the sequences in Tables II to IX. Examples of such ribozymes also are shown in Tables II to IX. Examples of such ribozymes consist essentially of sequences defined in these Tables. By "consists essentially of" is meant that the active ribozyme contains an enzymatic center equivalent to those in the examples, and binding arms able to bind mRNA such that cleavage at the target site occurs. Other sequences may be present which do not interfere with such cleavage.

In another aspect of the invention, ribozymes that cleave target RNA molecules and inhibit VEGF-R (specifically flt-1 and flk-1/KDR) activity are expressed from transcription units inserted into DNA or RNA vectors. The

recombinant vectors are preferably DNA plasmids or viral vectors. Ribozyme expressing viral vectors could be constructed based on, but not limited to, adeno-associated virus, retrovirus, adenovirus, or alphavirus. Preferably,
5 the recombinant vectors capable of expressing the ribozymes are delivered as described above, and persist in target cells. Alternatively, viral vectors may be used that provide for transient expression of ribozymes. Such vectors might be repeatedly administered as necessary.
10 Once expressed, the ribozymes cleave the target mRNA. Delivery of ribozyme expressing vectors could be systemic, such as by intravenous or intramuscular administration, by administration to target cells ex-planted from the patient followed by reintroduction into the patient, or by any
15 other means that would allow for introduction into the desired target cell.

By "vectors" is meant any nucleic acid- and/or viral-based technique used to deliver a desired nucleic acid.

Other features and advantages of the invention will
20 be apparent from the following description of the preferred embodiments thereof, and from the claims.

Description Of The Preferred Embodiments

First the drawings will be described briefly.

Drawings

25 Figure 1 is a diagrammatic representation of the hammerhead ribozyme domain known in the art. Stem II can be ≥ 2 base-pair long.

Figure 2a is a diagrammatic representation of the hammerhead ribozyme domain known in the art; Figure 2b is
30 a diagrammatic representation of the hammerhead ribozyme as divided by Uhlenbeck (1987, *Nature*, 327, 596-600) into a substrate and enzyme portion; Figure 2c is a similar diagram showing the hammerhead divided by Haseloff and Gerlach (1988, *Nature*, 334, 585-591) into two portions;
35 and Figure 2d is a similar diagram showing the hammerhead

divided by Jeffries and Symons (1989, *Nucl. Acids. Res.*, 17, 1371-1371) into two portions.

Figure 3 is a diagrammatic representation of the general structure of a hairpin ribozyme. Helix 2 (H2) is provided with at least 4 base pairs (i.e., n is 1, 2, 3 or 4) and helix 5 can be optionally provided of length 2 or more bases (preferably 3 - 20 bases, i.e., m is from 1 - 20 or more). Helix 2 and helix 5 may be covalently linked by one or more bases (i.e., r is \geq 1 base). Helix 1, 4 or 5 may also be extended by 2 or more base pairs (e.g., 4 - 20 base pairs) to stabilize the ribozyme structure, and preferably is a protein binding site. In each instance, each N and N' independently is any normal or modified base and each dash represents a potential base-pairing interaction. These nucleotides may be modified at the sugar, base or phosphate. Complete base-pairing is not required in the helices, but is preferred. Helix 1 and 4 can be of any size (i.e., o and p is each independently from 0 to any number, e.g., 20) as long as some base-pairing is maintained. Essential bases are shown as specific bases in the structure, but those in the art will recognize that one or more may be modified chemically (abasic, base, sugar and/or phosphate modifications) or replaced with another base without significant effect. Helix 4 can be formed from two separate molecules, i.e., without a connecting loop. The connecting loop when present may be a ribonucleotide with or without modifications to its base, sugar or phosphate. "q" is \geq 2 bases. The connecting loop can also be replaced with a non-nucleotide linker molecule. H refers to bases A, U, or C. Y refers to pyrimidine bases. "—" refers to a covalent bond.

Figure 4 is a representation of the general structure of the hepatitis delta virus ribozyme domain known in the art.

Figure 5 is a representation of the general structure of the VS RNA ribozyme domain.

Figure 6 is a schematic representation of an RNaseH accessibility assay. Specifically, the left side of Figure 6 is a diagram of complementary DNA oligonucleotides bound to accessible sites on the target RNA.

5 Complementary DNA oligonucleotides are represented by broad lines labeled A, B, and C. Target RNA is represented by the thin, twisted line. The right side of Figure 6 is a schematic of a gel separation of uncut target RNA from a cleaved target RNA. Detection of target

10 RNA is by autoradiography of body-labeled, T7 transcript. The bands common to each lane represent uncleaved target RNA; the bands unique to each lane represent the cleaved products.

Figure 7 shows the effect of hammerhead ribozymes targeted against flt-1 receptor on the binding of VEGF to the surface of human microvascular endothelial cells. Sequences of the ribozymes used are shown in Table II; the length of stem II region is 3 bp. The hammerhead ribozymes were chemically modified such that the ribozyme

20 consists of ribose residues at five positions (see Figure 11); U4 and U7 positions contain 2'-NH₂ modifications, the remaining nucleotide positions contain 2'-O-methyl substitutions; four nucleotides at the 5' terminus contains phosphorothioate substitutions. Additionally, the 3' end

25 of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose. The results of two separate experiments are shown as separate bars for each set. Each bar represents the average of triplicate samples. The standard deviation is shown with error bars. For the flt-1 data, 500 nM

30 ribozyme (3:1 charge ratio with LipofectAMINE®) was used. Control 1-10 is the control for ribozymes 307-2797, control 11-20 is the control for ribozymes 3008-5585. The Control 1-10 and Control 11-20 represent the treatment of cells with LipofectAMINE® alone without any ribozymes.

35 Figure 8 shows the effect of hammerhead ribozymes targeted against KDR receptor on the binding of VEGF to KDR on the surface of human microvascular endothelial

cells. Sequences of the ribozymes used are shown in Table IV; the length of stem II region is 3 bp. The hammerhead ribozymes were chemically modified such that the ribozyme consists of ribose residues at five positions (see Figure 5 11); U4 and U7 positions contain 2'-NH₂ modifications, the remaining nucleotide positions contain 2'-O-methyl substitutions; four nucleotides at the 5' terminus contains phosphorothioate substitutions. Additionally, the 3' end 10 of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose. The Control 1-10 and Control 11-20 represent the treatment of cells with LipofectAMINE® alone without any ribozymes. Irrel. RZ, is a control experiment wherein the cells are treated with a non-KDR-targeted ribozyme complexed with Lipofectamine®. 200 nM ribozyme (3:1 15 charge ratio with LipofectAMINE®) was used. In addition to the KDR-targeted ribozymes, the effect on VEGF binding of a ribozyme targeted to an irrelevant mRNA (irrel. RZ) is also shown. Because the affinity of KDR for VEGF is about 10-fold lower than the affinity of flt-1 for VEGF, 20 a higher concentration of VEGF was used in the binding assay.

Figure 9 shows the specificity of hammerhead ribozymes targeted against flt-1 receptor. Inhibition of the binding of VEGF, urokinase plasminogen activator (UPA) and 25 fibroblast growth factor (FGF) to their corresponding receptors as a function of anti-FLT ribozymes is shown. The sequence and description of the ribozymes used are as described under Figure 7 above. The average of triplicate samples is given; percent inhibition as calculated below.

30 Figure 10 shows the inhibition of the proliferation of Human aortic endothelial cells (HAEC) mediated by phosphorothioate antisense oligodeoxynucleotides targeted against human KDR receptor RNA. Cell proliferation (O.D. 490) as a function of antisense oligodeoxynucleotide 35 concentration is shown. KDR 21AS represents a 21 nt phosphorothioate antisense oligodeoxynucleotide targeted against KDR RNA. KDR 21 Scram represents a 21 nt

phosphorothioate oligodeoxynucleotide having a scrambled sequence. LF represents the lipid carrier Lipofectin.

Figure 11 shows *in vitro* cleavage of flt-1 RNA by hammerhead ribozymes. A) diagrammatic representation of hammerhead ribozymes targeted against flt-1 RNA. The hammerhead (HH) ribozymes were chemically modified such that the ribozyme consists of ribose residues at five positions; U4 and U7 positions contain 2'-NH₂ modifications, the remaining nucleotide positions contain 2'-O-methyl substitutions; four nucleotides at the 5' terminus contains phosphorothioate substitutions. Additionally, the 3' end of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose (designated as 3'-iH). 1358 HH-A and 4229 HH-A contain 3 base-paired stem II region. 1358 HH-B and 4229 HH-B contain 4 base-paired stem II region. B) and C) shows *in vitro* cleavage kinetics of HH ribozymes targeted against sites 1358 and 4229 within the flt-1 RNA.

Figure 12 shows inhibition of human microvascular endothelial cell proliferation mediated by anti-flt-1 hammerhead ribozymes. A) Diagrammatic representation of hammerhead (HH) ribozymes targeted against sites 1358 and 4229 within the flt-1 RNA. B) Graphical representation of the inhibition of cell proliferation mediated by 1358HH and 4229HH ribozymes.

Figure 13 shows inhibition of human microvascular endothelial cell proliferation mediated by anti-KDR hammerhead ribozymes. The figure is a graphical representation of the inhibition of cell proliferation mediated by hammerhead ribozymes targeted against sites 527, 730, 3702 and 3950 within the KDR RNA. Irrelevant HH RZ is a hammerhead ribozyme targeted to an irrelevant target. All of these ribozymes, including the Irrelevant HH RZ, were chemically modified such that the ribozyme consists of ribose residues at five positions; U4 and U7 positions contain 2'-NH₂ modifications, the remaining nucleotide positions contain 2'-O-methyl substitutions; four

nucleotides at the 5' termini contain phosphorothioate substitutions. Additionally, the 3' end of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose (3'-iH).

5 Figure 14 shows *in vitro* cleavage of KDR RNA by hammerhead ribozymes. The hammerhead (HH) ribozymes were chemically modified such that the ribozyme consists of ribose residues at five positions; U4 and U7 positions contain 2'-NH₂ modifications, the remaining nucleotide 10 positions contain 2'-O-methyl substitutions. Additionally, the 3' end of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose (designated as 3'-iH). 726 HH and 527 HH contain 4 base-paired stem II region. Percent 15 *in vitro* cleavage kinetics as a function of time of HH ribozymes targeted against sites 527 and 726 within the KDR RNA is shown.

Figure 15 shows *in vitro* cleavage of KDR RNA by hammerhead ribozymes. The hammerhead (HH) ribozymes were chemically modified such that the ribozyme consists of 20 ribose residues at five positions; U4 and U7 positions contain 2'-NH₂ modifications, the remaining nucleotide positions contain 2'-O-methyl substitutions. Additionally, the 3' end of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose (designated as 3'-iH). 3702 25 HH and 3950 HH contain 4 base-paired stem II region. Percent *in vitro* cleavage kinetics as a function of time of HH ribozymes targeted against sites 3702 and 3950 within the KDR RNA is shown.

Figure 16 shows *in vitro* cleavage of RNA by hammer- 30 head ribozymes that are targeted to sites that are conserved between flt-1 and KDR RNA. The hammerhead (HH) ribozymes were chemically modified such that the ribozyme consists of ribose residues at five positions; U4 and U7 35 positions contain 2'-NH₂ modifications, the remaining nucleotide positions contain 2'-O-methyl substitutions. Additionally, the 3' end of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose (designated as 3'-iH).

FLT/KDR-I HH ribozyme was synthesized with either a 4 base-paired or a 3 base-paired stem II region. FLT/KDR-I HH can cleave site 3388 within flt-1 RNA and site 3151 within KDR RNA. Percent *in vitro* cleavage kinetics as a function of time of HH ribozymes targeted against sites 3702 and 3950 within the KDR RNA is shown.

Figure 17 shows inhibition of human microvascular endothelial cell proliferation mediated by anti-KDR and anti-flt-1 hammerhead ribozymes. The figure is a graphical representation of the inhibition of cell proliferation mediated by hammerhead ribozymes targeted against sites KDR sites-527, 726 or 3950 or flt-1 site 4229. The figure also shows enhanced inhibition of cell proliferation by a combination of flt-1 and KDR hammerhead ribozymes. 4229+527, indicates the treatment of cells with both the flt 4229 and the KDR 527 ribozymes. 4229+726, indicates the treatment of cells with both the flt 4229 and the KDR 726 ribozymes. 4229+3950, indicates the treatment of cells with both the flt 4229 and the KDR 3950 ribozymes. VEGF -, indicates the basal level of cell proliferation in the absence of VEGF. A, indicates catalytically active ribozyme; I, indicates catalytically inactive ribozyme. All of these ribozymes were chemically modified such that the ribozyme consists of ribose residues at five positions; U4 and U7 positions contain 2'-NH₂ modifications, the remaining nucleotide positions contain 2'-O-methyl substitutions; four nucleotides at the 5' termini contain phosphorothioate substitutions. Additionally, the 3' end of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose (3'-iH).

Figure 18 shows the inhibition of VEGF-induced angiogenesis in rat cornea mediated by anti-flt-1 hammerhead ribozyme. All of these ribozymes were chemically modified such that the ribozyme consists of ribose residues at five positions; U4 position contains 2'-C-allyl modifications, the remaining nucleotide positions contain 2'-O-methyl substitutions; four nucleotides at the 5' termini contain

phosphorothioate substitutions. Additionally, the 3' end of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose (3'-iH). A decrease in the Surface Area corresponds to a reduction in angiogenesis. VEGF alone, 5 corresponds to treatment of the cornea with VEGF and no ribozymes. Vehicle alone, corresponds to the treatment of the cornea with the carrier alone and no VEGF. This control gives a basal level of Surface Area. Active 4229 HH, corresponds to the treatment of cornea with the flt-1 10 4229 HH ribozyme in the absence of any VEGF. This control also gives a basal level of Surface Area. Active 4229 HH + VEGF, corresponds to the co-treatment of cornea with the flt-1 4229 HH ribozyme and VEGF. Inactive 4229 HH + VEGF, corresponds to the co-treatment of cornea with a cata- 15 lytically inactive version of 4229 HH ribozyme and VEGF.

Ribozymes

Ribozymes of this invention block to some extent VEGF-R (specifically flt-1 and flk-1/KDR) production and can be used to treat disease or diagnose such disease. 20 Ribozymes will be delivered to cells in culture, to cells or tissues in animal models of angiogenesis and/or RA and to human cells or tissues *ex vivo* or *in vivo*. Ribozyme cleavage of VEGF-R RNAs (specifically RNAs that encode flt-1 and flk-1/KDR) in these systems may alleviate 25 disease symptoms.

Target sites

Targets for useful ribozymes can be determined as disclosed in Draper et al., International PCT Publication No. WO 95/13380, and hereby incorporated by reference 30 herein in totality. Other examples include the following PCT applications which concern inactivation of expression of disease-related genes: WO 95/23225, WO 95/13380, WO 94/02595, incorporated by reference herein. Rather than repeat the guidance provided in those documents here, 35 below are provided specific examples of such methods, not

limiting to those in the art. Ribozymes to such targets are designed as described in those applications and synthesized to be tested *in vitro* and *in vivo*, as also described.

5 The sequence of human and mouse *flt-1*, *KDR* and/or *flk-1* mRNAs were screened for optimal ribozyme target sites using a computer folding algorithm. Hammerhead or hairpin ribozyme cleavage sites were identified. These sites are shown in Tables II to IX (all sequences are 5'
10 to 3' in the tables; X can be any base-paired sequence, the actual sequence is not relevant here). The nucleotide base position is noted in the Tables as that site to be cleaved by the designated type of ribozyme. While mouse and human sequences can be screened and ribozymes there-
15 after designed, the human targeted sequences are of most utility. However, as discussed in Stinchcomb et al., "Method and Composition for Treatment of Restenosis and Cancer Using Ribozymes," filed May 18, 1994, U.S.S.N. 08/245,466, mouse targeted ribozymes may be useful to test
20 efficacy of action of the ribozyme prior to testing in humans. The nucleotide base position is noted in the Tables as that site to be cleaved by the designated type of ribozyme.

Hammerhead or hairpin ribozymes were designed that
25 could bind and cleave target RNA in a sequence-specific manner. The ribozymes were individually analyzed by computer folding (Jaeger et al., 1989 *Proc. Natl. Acad. Sci. USA*, 86, 7706) to assess whether the ribozyme sequences fold into the appropriate secondary structure.
30 Those ribozymes with unfavorable intramolecular interactions between the binding arms and the catalytic core were eliminated from consideration. Varying binding arm lengths can be chosen to optimize activity.

Referring to Figure 6, mRNA is screened for accessible cleavage sites by the method described generally in Draper et al., PCT WO93/23569, hereby incorporated by reference herein. Briefly, DNA oligonucleotides

complementary to potential hammerhead or hairpin ribozyme cleavage sites were synthesized. A polymerase chain reaction is used to generate substrates for T7 RNA polymerase transcription from human and mouse flt-1, KDR and/or flk-1 cDNA clones. Labeled RNA transcripts are synthesized *in vitro* from the templates. The oligonucleotides and the labeled transcripts were annealed, RNaseH was added and the mixtures were incubated for the designated times at 37°C. Reactions are stopped and RNA separated on sequencing polyacrylamide gels. The percentage of the substrate cleaved is determined by autoradiographic quantitation using a PhosphorImaging system. From these data, hammerhead or hairpin ribozyme sites are chosen as the most accessible.

Ribozymes of the hammerhead or hairpin motif were designed to anneal to various sites in the mRNA message. The binding arms are complementary to the target site sequences described above. The ribozymes were chemically synthesized. The method of synthesis used follows the procedure for normal RNA synthesis as described in Usman et al., 1987 *J. Am. Chem. Soc.*, 109, 7845; Scaringe et al., 1990 *Nucleic Acids Res.*, 18, 5433; and Wincott et al., 1995 *Nucleic Acids Res.* 23, 2677-2684 and makes use of common nucleic acid protecting and coupling groups, such as dimethoxytrityl at the 5'-end, and phosphoramidites at the 3'-end. Small scale synthesis were conducted on a 394 Applied Biosystems, Inc. synthesizer using a modified 2.5 μmol scale protocol with a 5 min coupling step for alkylsilyl protected nucleotides and 2.5 min coupling step for 2'-O-methylated nucleotides. Table XI outlines the amounts, and the contact times, of the reagents used in the synthesis cycle. A 6.5-fold excess (163 μL of 0.1 M = 16.3 μmol) of phosphoramidite and a 24-fold excess of S-ethyl tetrazole (238 μL of 0.25 M = 59.5 μmol) relative to polymer-bound 5'-hydroxyl was used in each coupling cycle. Average coupling yields on the 394 Applied Biosystems, Inc. synthesizer, determined by

colorimetric quantitation of the trityl fractions, were 97.5-99%. Other oligonucleotide synthesis reagents for the 394 Applied Biosystems, Inc. synthesizer: detritylation solution was 2% TCA in methylene chloride (ABI); capping 5 was performed with 16% N-methyl imidazole in THF (ABI) and 10% acetic anhydride/10% 2,6-lutidine in THF (ABI); oxidation solution was 16.9 mM I₂, 49 mM pyridine, 9% water in THF (Millipore). B & J Synthesis Grade acetonitrile was used directly from the reagent bottle. S-Ethyl tetra-10 zole solution (0.25 M in acetonitrile) was made up from the solid obtained from American International Chemical, Inc.

Deprotection of the RNA was performed as follows. The polymer-bound oligoribonucleotide, trityl-off, was transferred 15 from the synthesis column to a 4mL glass screw top vial and suspended in a solution of methylamine (MA) at 65 °C for 10 min. After cooling to -20 °C, the supernatant was removed from the polymer support. The support was washed three times with 1.0 mL of EtOH:MeCN:H₂O/3:1:1, 20 vortexed and the supernatant was then added to the first supernatant. The combined supernatants, containing the oligoribonucleotide, were dried to a white powder.

The base-deprotected oligoribonucleotide was resuspended 25 in anhydrous TEA•HF/NMP solution (250 μL of a solution of 1.5mL N-methylpyrrolidinone, 750 μL TEA and 1.0 mL TEA•3HF to provide a 1.4M HF concentration) and heated to 65°C for 1.5 h. The resulting, fully deprotected, oligomer was quenched with 50 mM TEAB (9 mL) prior to anion exchange desalting.

30 For anion exchange desalting of the deprotected oligomer, the TEAB solution was loaded onto a Qiagen 500® anion exchange cartridge (Qiagen Inc.) that was prewashed with 50 mM TEAB (10 mL). After washing the loaded cartridge with 50 mM TEAB (10 mL), the RNA was eluted with 35 2 M TEAB (10 mL) and dried down to a white powder.

Inactive hammerhead ribozymes were synthesized by substituting a U for G₅ and a U for A₁₄ (numbering from

Hertel, K. J., et al., 1992, Nucleic Acids Res., 20, 3252).

The average stepwise coupling yields were >98% (Wincott et al., 1995 *Nucleic Acids Res.* 23, 2677-2684).

5 Hairpin ribozymes are synthesized in two parts and annealed to reconstruct the active ribozyme (Chowrira and Burke, 1992 *Nucleic Acids Res.*, 20, 2835-2840). Ribozymes are also synthesized from DNA templates using bacteriophage T7 RNA polymerase (Milligan and Uhlenbeck, 1989, 10 *Methods Enzymol.* 180, 51).

All ribozymes are modified extensively to enhance stability by modification with nuclease resistant groups, for example, 2'-amino, 2'-C-allyl, 2'-flouro, 2'-O-methyl, 2''-H (for a review see Usman and Cedergren, 1992 *TIBS* 17, 15 34; Usman et al., 1994 *Nucleic Acids Symp. Ser.* 31, 163). Ribozymes are purified by gel electrophoresis using general methods or are purified by high pressure liquid chromatography (HPLC; See Usman et al., PCT Publication No. WO95/23225, the totality of which is hereby incorporated herein by reference) and are resuspended in water.

The sequences of the ribozymes that are chemically synthesized, useful in this study, are shown in Tables II to IX. Those in the art will recognize that these sequences are representative only of many more such 25 sequences where the enzymatic portion of the ribozyme (all but the binding arms) is altered to affect activity. Stem-loop IV sequence of hairpin ribozymes listed in for example Table III (5'-CACGUUGUG-3') can be altered (substitution, deletion, and/or insertion) to contain any 30 sequence, provided a minimum of two base-paired stem structure can form. The sequences listed in Tables II to IX may be formed of ribonucleotides or other nucleotides or non-nucleotides. Such ribozymes are equivalent to the ribozymes described specifically in the Tables.

Optimizing Ribozyme Activity

Ribozyme activity can be optimized as described by Stinchcomb et al., *supra*. The details will not be repeated here, but include altering the length of the 5 ribozyme binding arms (stems I and III, see Figure 2c), or chemically synthesizing ribozymes with modifications that prevent their degradation by serum ribonucleases (see e.g., Eckstein et al., International Publication No. WO 92/07065; Perrault et al., 1990 *Nature* 344, 565; Pieken et 10 al., 1991 *Science* 253, 314; Usman and Cedergren, 1992 *Trends in Biochem. Sci.* 17, 334; Usman et al., International Publication No. WO 93/15187; Rossi et al., International Publication No. WO 91/03162; Beigelman et al., 1995 *J. Biol Chem.* in press; as well as Sproat, US 15 Patent No. 5,334,711 which describe various chemical modifications that can be made to the sugar moieties of enzymatic RNA molecules). Modifications which enhance their efficacy in cells, and removal of stem II bases to shorten RNA synthesis times and reduce chemical requirements are desired. (All these publications are hereby 20 incorporated by reference herein).

Sullivan, et al., *supra*, describes the general methods for delivery of enzymatic RNA molecules. Ribozymes may be administered to cells by a variety of 25 methods known to those familiar to the art, including, but not restricted to, encapsulation in liposomes, by iontophoresis, or by incorporation into other vehicles, such as hydrogels, cyclodextrins, biodegradable nanocapsules, and bioadhesive microspheres. For some indications, ribozymes 30 may be directly delivered *ex vivo* to cells or tissues with or without the aforementioned vehicles. Alternatively, the RNA/vehicle combination is locally delivered by direct injection or by use of a catheter, infusion pump or stent. Other routes of delivery include, but are not limited to, 35 intravascular, intramuscular, subcutaneous or joint injection, aerosol inhalation, oral (tablet or pill form), topical, systemic, ocular, intraperitoneal and/or intra-

thecal delivery. More detailed descriptions of ribozyme delivery and administration are provided in Sullivan et al., supra and Draper et al., supra which have been incorporated by reference herein.

5 Another means of accumulating high concentrations of a ribozyme(s) within cells is to incorporate the ribozyme-encoding sequences into a DNA or RNA expression vector. Transcription of the ribozyme sequences are driven from a promoter for eukaryotic RNA polymerase I (pol I), RNA
10 polymerase II (pol II), or RNA polymerase III (pol III). Transcripts from pol II or pol III promoters will be expressed at high levels in all cells; the levels of a given pol II promoter in a given cell type will depend on the nature of the gene regulatory sequences (enhancers,
15 silencers, etc.) present nearby. Prokaryotic RNA polymerase promoters are also used, providing that the prokaryotic RNA polymerase enzyme is expressed in the appropriate cells (Elroy-Stein and Moss, 1990 *Proc. Natl. Acad. Sci. U S A*, 87, 6743-7; Gao and Huang 1993 *Nucleic Acids Res.*,
20 21, 2867-72; Lieber et al., 1993 *Methods Enzymol.*, 217, 47-66; Zhou et al., 1990 *Mol. Cell. Biol.*, 10, 4529-37; Thompson et al., 1995 supra). Several investigators have demonstrated that ribozymes expressed from such promoters can function in mammalian cells (e.g. Kashani-Sabet et
25 al., 1992 *Antisense Res. Dev.*, 2, 3-15; Ojwang et al., 1992 *Proc. Natl. Acad. Sci. U S A*, 89, 10802-6; Chen et al., 1992 *Nucleic Acids Res.*, 20, 4581-9; Yu et al., 1993 *Proc. Natl. Acad. Sci. U S A*, 90, 6340-4; L'Huillier et al., 1992 *EMBO J.* 11, 4411-8; Lisziewicz et al., 1993
30 *Proc. Natl. Acad. Sci. U. S. A.*, 90, 8000-4; Thompson et al., 1995 *Nucleic Acids Res.* 23, 2259). The above ribozyme transcription units can be incorporated into a variety of vectors for introduction into mammalian cells, including but not restricted to, plasmid DNA vectors,
35 viral DNA vectors (such as adenovirus or adeno-associated virus vectors), or viral RNA vectors (such as retroviral or alphavirus vectors).

In a preferred embodiment of the invention, a transcription unit expressing a ribozyme that cleaves RNAs that encode flt-1, KDR and/or flk-1 are inserted into a plasmid DNA vector or an adenovirus or adeno-associated 5 virus DNA viral vector or a retroviral RNA vector. Viral vectors have been used to transfer genes and lead to either transient or long term gene expression (Zabner et al., 1993 Cell 75, 207; Carter, 1992 Curr. Op. Biotech. 3, 533). The adenovirus, AAV or retroviral vector is 10 delivered as recombinant viral particles. The DNA may be delivered alone or complexed with vehicles (as described for RNA above). The recombinant adenovirus or AAV or retroviral particles are locally administered to the site of treatment, e.g., through incubation or inhalation in 15 vivo or by direct application to cells or tissues ex vivo. Retroviral vectors have also been used to express ribozymes in mammalian cells (Ojwang et al., 1992 *supra*; Thompson et al., 1995 *supra*).

flt-1, KDR and/or flk-1 are attractive nucleic acid-based therapeutic targets by several criteria. The interaction between VEGF and VEGF-R is well-established. Efficacy can be tested in well-defined and predictive animal models. Finally, the disease conditions are serious and current therapies are inadequate. Whereas 25 protein-based therapies would inhibit VEGF activity nucleic acid-based therapy provides a direct and elegant approach to directly modulate flt-1, KDR and/or flk-1 expression.

Because flt-1 and KDR mRNAs are highly homologous in 30 certain regions, some ribozyme target sites are also homologous (see Table X). In this case, a single ribozyme will target both flt-1 and KDR mRNAs. At partially homologous sites, a single ribozyme can sometimes be designed to accomodate a site on both mRNAs by including 35 G/U basepairing. For example, if there is a G present in a ribozyme target site in KDR mRNA at the same position there is an A in the flt-1 ribozyme target site, the

ribozyme can be synthesized with a U at the complementary position and it will bind both to sites. The advantage of one ribozyme that targets both VEGF-R mRNAs is clear, especially in cases where both VEGF receptors may contribute to the progression of angiogenesis in the disease state.

"Angiogenesis" refers to formation of new blood vessels which is an essential process in reproduction, development and wound repair. "Tumor angiogenesis" refers to the induction of the growth of blood vessels from surrounding tissue into a solid tumor. Tumor growth and tumor metastasis are dependent on angiogenesis (for a review see Folkman, 1985 *supra*; Folkman 1990 *J. Natl. Cancer Inst.*, 82, 4; Folkman and Shing, 1992 *J. Biol. Chem.* 267, 10931).

Angiogenesis plays an important role in other diseases such as arthritis wherein new blood vessels have been shown to invade the joints and degrade cartilage (Folkman and Shing, *supra*).

"Retinopathy" refers to inflammation of the retina and/or degenerative condition of the retina which may lead to occlusion of the retina and eventual blindness. In "diabetic retinopathy" angiogenesis causes the capillaries in the retina to invade the vitreous resulting in bleeding and blindness which is also seen in neonatal retinopathy (for a review see Folkman, 1985 *supra*; Folkman 1990 *supra*; Folkman and Shing, 1992 *supra*).

Example 1: flt-1, KDR and/or flk-1 ribozymes

By engineering ribozyme motifs applicant has designed several ribozymes directed against flt-1, KDR and/or flk-1 encoded mRNA sequences. These ribozymes were synthesized with modifications that improve their nuclease resistance (Beigelman et al., 1995 *J Biol. Chem.* 270, 25702) and enhance their activity in cells. The ability of ribozymes to cleave target sequences *in vitro* was evaluated essentially as described in Thompson et al., PCT Publication

No. WO 93/23057; Draper et al., PCT Publication No. WO 95/04818.

Example 2: Effect of ribozymes on the binding of VEGF to flt-1, KDR and/or flk-1 receptors

5 Several common human cell lines are available that express endogenous flt-1, KDR and/or flk-1. flt-1, KDR and/or flk-1 can be detected easily with monoclonal antibodies. Use of appropriate fluorescent reagents and fluorescence-activated cell-sorting (FACS) will permit
10 direct quantitation of surface flt-1, KDR and/or flk-1 on a cell-by-cell basis. Active ribozymes are expected to directly reduce flt-1, KDR and/or flk-1 expression and thereby reduce VEGF binding to the cells. In this example, human umbilical cord microvascular endothelial
15 cells were used.

Cell Preparation:

Plates are coated with 1.5% gelatin and allowed to stand for one hour. Cells (e.g., microvascular endothelial cells derived from human umbilical cord vein) are
20 plated at 20,000 cells/well (24 well plate) in 200 ml growth media and incubated overnight (~ 1 doubling) to yield ~40,000 cells (75-80% confluent).

Ribozyme treatment:

Media is removed from cells and the cells are washed
25 two times with 300 ml 1X PBS: Ca²⁺: Mg²⁺ mixture. A complex of 200-500 nM ribozyme and LipofectAMINE® (3:1 lipid: phosphate ratio) in 200 ml OptiMEM® (5% FBS) was added to the cells. The cells are incubated for 6 hr (equivalent to 2-3 VEGF-R turnovers).

30 ¹²⁵I VEGF binding assay:

The assay is carried out on ice to inhibit internalization of VEGF during the experiment. The media containing the ribozyme is removed from the cells and the cells

are washed twice with with 300 ml 1X PBS: Ca²⁺: Mg²⁺ mixture containing 1% BSA. Appropriate ¹²⁵I VEGF solution (100,000 cpm/well, +/- 10 X cold 1X PBS, 1% BSA) was applied to the cells. The cells are incubated on ice for 5 1 h. ¹²⁵I VEGF-containing solution is removed and the cells are washed three times with with 300 ml 1X PBS: Ca²⁺: Mg²⁺ mixture containing 1% BSA. To each well 300 ml of 100 mM Tris-HCl, pH 8.0, 0.5% Triton X-100 was added and the the mixture was incubated for 2 min. The ¹²⁵I VEGF-binding was 10 quantitated using standard scintillation counting techniques. Percent inhibition was calculated as follows:

$$\text{Percent Inhibition} =$$

$$\frac{\text{cpm } ^{125}\text{I VEGF bound by the ribozyme-treated samples}}{\text{cpm } ^{125}\text{I VEGF bound by the Control sample}} \times 100$$

15 Example 3: Effect of hammerhead ribozymes targeted against flt-1 receptor on the binding of VEGF

Hammerhead ribozymes targeted to twenty sites within flt-1 RNA were synthesized as described above. Sequence of the ribozymes used are shown in Table II; the length of 20 stem II region is 3 bp. The hammerhead ribozymes were chemically modified such that the ribozyme consists of ribose residues at five positions; U4 and U7 positions contain 2'-NH₂ modifications, the remaining nucleotide positions contain 2'-O-methyl substitutions; four nucleotides at the 5' terminus contains phosphorothioate substitutions. Additionally, 3' end of the ribozyme 25 contains a 3'-3' linked inverted abasic ribose.

Referring to Figure 7, the effect of hammerhead ribozymes targeted against flt-1 receptor on the binding 30 of VEGF to flt-1 on the surface of human microvascular endothelial cells is shown. The majority of the ribozymes tested were able to inhibit the expression of flt-1 and thereby were able to inhibit the binding of VEGF.

In order to determine the specificity of ribozymes 35 targeted against flt-1 RNA, the effect of five anti-flt-1 ribozymes on the binding of VEGF, UPA (urokinase plasmino-

gen activator) and FGF (fibroblast growth factor) to their corresponding receptors were assayed. As shown in Figure 9, there was significant inhibition of VEGF binding to its receptors on cells treated with anti-flt-1 ribozymes.

5 There was no specific inhibition of the binding of UPA and FGF to their corresponding receptors. These data strongly suggest that anti-flt-1 ribozymes specifically cleave flt-1 RNA and not RNAs encoding the receptors for UPA and FGF, resulting in the inhibition of flt-1 receptor expression on the surface of the cells. Thus the ribozymes are responsible for the inhibition of VEGF binding but not the binding of UPA and FGF.

Example 4: Effect of hammerhead ribozymes targeted against KDR receptor on the binding of VEGF

15 Hammerhead ribozymes targeted to twenty one sites within KDR RNA were synthesized as described above. Sequence of the ribozymes used are shown in Table IV; the length of stem II region is 3 bp. The hammerhead ribozymes were chemically modified such that the ribozyme 20 consists of ribose residues at five positions; U4 and U7 positions contain 2'-NH₂ modifications, the remaining nucleotide positions contain 2'-O-methyl substitutions; four nucleotides at the 5' terminus contains phosphorothioate substitutions. Additionally, the 3' end of the 25 ribozyme contains a 3'-3' linked inverted abasic deoxyribose.

Referring to Figure 8, the effect of hammerhead ribozymes targeted against KDR receptor on the binding of VEGF to KDR on the surface of human microvascular endothelial cells is shown. A majority of the ribozymes tested were able to inhibit the expression of KDR and thereby were able to inhibit the binding of VEGF. As a control, the cells were treated with a ribozyme that is not targeted towards KDR RNA (irrel. RZ); there was no 35 specific inhibition of VEGF binding. The results from this control experiment strongly suggest that the inhibi-

tion of VEGF binding observed with anti-KDR ribozymes is a ribozyme-mediated inhibition.

Example 5: Effect of ribozymes targeted against VEGF receptors on cell proliferation

5 Cell Preparation:

24-well plates are coated with 1.5% gelatin (porcine skin 300 bloom). After 1 hr, excess gelatin is washed off of the plate. Microvascular endothelial cells are plated at 5,000 cells/well (24 well plate) in 200 ml growth media. The cells are allowed to grow for - 18 hr (- 1 doubling) to yield ~10,000 cells (25-30% confluent).

Ribozyme treatment:

Media is removed from the cells, and the cells are washed two times with 300 ml 1X PBS: Ca²⁺: Mg²⁺ mixture.

15 For anti-flt-1 HH ribozyme experiment (Figure 12) a complex of 500 nM ribozyme; 15 mM LFA (3:1 lipid:phosphate ratio) in 200 ml OptiMEM (5% FCS) media was added to the cells. Incubation of cells is carried out for 6 hr (equivalent to 2-3 VEGF receptor turnovers).

20 For anti-KDR HH ribozyme experiment (Figure 13) a complex of 200 nM ribozyme; 5.25 mM LFA (3:1 lipid: phosphate ratio) in 200 ml OptiMEM (5% FCS) media was added to the cells. Incubation of cells is carried out for 3 hr.

25 Proliferation:

After three or six hours, the media is removed from the cells and the cells are washed with 300 ml 1X PBS: Ca²⁺: Mg²⁺ mixture. Maintenance media (contains dialyzed 10% FBS) +/- VEGF or basic FGF at 10 ng/ml is added to the cells. The cells are incubated for 48 or 72 h. The cells are trypsinized and counted (Coulter counter). Trypan blue is added on one well of each treatment as control.

As shown in Figure 12B, VEGF and basic FGF can stimulate human microvascular endothelial cell proliferation. However, treatment of cells with 1358 HH or 4229 HH ribozymes, targeted against flt-1 mRNA, results in a significant decrease in the ability of VEGF to stimulate endothelial cell proliferation. These ribozymes do not inhibit the FGF-mediated stimulation of endothelial cell proliferation.

Human microvascular endothelial cells were also treated with hammerhead ribozymes targeted against sites 527, 730, 3702 or 3950 within the KDR mRNA. As shown in Figure 13, all four ribozymes caused significant inhibition of VEGF-mediated induction of cell proliferation. No significant inhibition of cell proliferation was observed when the cells were treated with a hammerhead ribozyme targeted to an irrelevant RNA. Additionally, none of the ribozymes inhibited FGF-mediated stimulation of cell proliferation.

These results strongly suggest that hammerhead ribozymes targeted against either flt-1 or KDR mRNA can specifically inhibit VEGF-mediated induction of endothelial cell proliferation.

Example 6: Effect of antisense oligonucleotides targeted against VEGF receptors on cell proliferation (colorimetric assay)

Following are some of the reagents used in the proliferation assay:

Cells: Human aortic endothelial cells (HAEC) from Clonetics®. Cells at early passage are preferably used.
Uptake Medium: EBM (from Clonetics®); 1% L-Glutamine; 20 mM Hepes; No serum; No antibiotics.

Growth Medium: EGM (from Clonetics®); FBS to 20%; 1% L-Glutamine; 20 mM Hepes.

Cell Plating: 96-well tissue culture plates are coated with 0.2% gelatin (50 ml/well). The gelatin is incubated in the wells at room temperature for 15-30

minutes. The gelatin is removed by aspiration and the wells are washed with PBS:Ca²⁺: Mg²⁺ mixture. PBS mixture is left in the wells until cells are ready to be added. HAEC cells were detached by trypsin treatment and resuspended at 1.25 x 10⁴/ml in growth medium. PBS is removed from plates and 200 ml of cells (i.e. 2.5 x 10³ cells/well) are added to each well. The cells are allowed to grow for 48 hours before the proliferation assay.

Assay: Growth medium is removed from the wells. The 10 cells are washed twice with PBS:Ca²⁺: Mg²⁺ mixture without antibiotics. A formulation of lipid/antisense oligonucleotide (antisense oligonucleotide is used here as a non-limiting example) complex is added to each well (100 ml/well) in uptake medium. The cells are incubated for 15 2-3 hours at 37°C in CO₂ incubator. After uptake, 100 ml/well of growth medium is added (gives final FBS concentration of 10%). After approximately 72 hours, 40 ml MTS® stock solution (made as described by manufacturer) was added to each well and incubated at 37°C for 1-3 20 hours, depending on the color development. (For this assay, 2 hours was sufficient). The intensity of color formation was determined on a plate reader at 490 nM.

Phosphorothioate-substituted antisense oligodeoxy-nucleotides were custom synthesized by The Midland 25 Certified Reagent Company®, Midland, Texas. Following non-limiting antisense oligodeoxynucleotides targeted against KDR RNA were used in the proliferation assay:

KDR 21 AS: 5'-GCA GCA CCT TGC TCT CCA TCC-3'

SCRAMBLED CONTROL: 5'-CTG CCA ACT TCC CAT GCC TGC-3'

30 As shown in Figure 10, proliferation of HAEC cells are specifically inhibited by increasing concentrations of the phosphorothioate anti-KDR-antisense oligodeoxynucleotide. The scrambled antisense oligonucleotide is not expected to bind the KDR RNA and therefore is not expected 35 to inhibit KDR expression. As expected, there is no detectable inhibition of proliferation of HAEC cells

treated with a phosphorothioate antisense oligonucleotide with scrambled sequence.

Example 7: In vitro cleavage of flt-1 RNA by hammerhead ribozymes

5 Referring to Figure 11A, hammerhead ribozymes (HH) targeted against sites 1358 and 4229 within the flt-1 RNA were synthesized as described above.

RNA cleavage assay in vitro:

Substrate RNA was 5' end-labeled using [γ -³²P] ATP and 10 T4 polynucleotide kinase (US Biochemicals). Cleavage reactions were carried out under ribozyme "excess" conditions. Trace amount (\leq 1 nM) of 5' end-labeled substrate and 40 nM unlabeled ribozyme were denatured and renatured separately by heating to 90°C for 2 min and snap-cooling 15 on ice for 10-15 min. The ribozyme and substrate were incubated, separately, at 37°C for 10 min in a buffer containing 50 mM Tris-HCl and 10 mM MgCl₂. The reaction was initiated by mixing the ribozyme and substrate solutions and incubating at 37°C. Aliquots of 5 ml are taken 20 at regular intervals of time and the reaction is quenched by mixing with equal volume of 2X formamide stop mix. The samples are resolved on 20 % denaturing polyacrylamide gels. The results were quantified and percentage of target RNA cleaved is plotted as a function of time.

25 Referring to Figure 11B and 11C, hammerhead ribozymes targeted against sites 1358 and 4229 within the flt-1 RNA are capable of cleaving target RNA efficiently *in vitro*.

Example 8: In vitro cleavage of KDR RNA by hammerhead ribozymes

30 In this non-limiting example, hammerhead ribozymes targeted against sites 726, 527, 3702 and 3950 within KDR RNA were synthesized as described above. RNA cleavage reactions were carried out *in vitro* essentially as described under Example 7.

Referring to Figures 14 and 15, all four ribozymes were able to cleave their cognate target RNA efficiently in a sequence-specific manner.

Example 9: In vitro cleavage of RNA by hammerhead ribozymes targeted against cleavage sites that are homologous between KDR and flt-1 mRNA

Because flt-1 and KDR mRNAs are highly homologous in certain regions, some ribozyme target sites are also homologous (see Table X). In this case, a single ribozyme will target both flt-1 and KDR mRNAs. Hammerhead ribozyme (FLT/KDR-I) targeted against one of the homologous sites between flt-1 and KDR (flt-1 site 3388 and KDR site 3151) was synthesized as described above. Ribozymes with either a 3 bp stem II or a 4 bp stem II were synthesized. RNA cleavage reactions were carried out *in vitro* essentially as described under Example 7.

Referring to Figure 16, FLT/KDR-I ribozyme with either a 3 or a 4 bp stem II was able to cleave its target RNA efficiently *in vitro*.

Example 10: Effect of multiple ribozymes targeted against both flt-1 and KDR RNA on cell proliferation

Since both flt-1 and KDR receptors of VEGF are involved in angiogenesis, the inhibition of the expression of both of these genes may be an effective approach to inhibit angiogenesis.

Human microvascular endothelial cells were treated with hammerhead ribozymes targeted against sites flt-1 4229 alone, KDR 527 alone, KDR 726 alone, KDR 3950 alone, flt-1 4229 + KDR 527, flt-1 4229 + KDR 726 or flt-1 4229 + KDR 3950. As shown in Figure 17, all the combinations of active ribozymes (A) caused significant inhibition of VEGF-mediated induction of cell proliferation. No significant inhibition of cell proliferation was observed when the cells were treated with a catalytically inactive (I) hammerhead ribozymes. Additionally, cells treated

with ribozymes targeted against both flt-1 and KDR RNAs-flt-1 4229 + KDR 527; flt-1 4229 + KDR 726; flt-1 4229 + KDR 3950, were able to cause a greater inhibition of VEGF-mediated induction of cell proliferation when 5 compared with individual ribozymes targeted against either flt-1 or KDR RNA (see flt-1 4229 alone; KDR 527 alone; KDR 726 alone; KDR 3950 alone). This strongly suggests that treatment of cells with multiple ribozymes may be a more effective means of inhibition of gene expression.

10 Animal Models

There are several animal models in which the anti-angiogenesis effect of nucleic acids of the present invention, such as ribozymes, directed against VEGF-R mRNAs can be tested. Typically a corneal model has been 15 used to study angiogenesis in rat and rabbit since recruitment of vessels can easily be followed in this normally avascular tissue (Pandey et al., 1995 *Science* 268: 567-569). In these models, a small Teflon or Hydron disk pretreated with an angiogenesis factor (e.g. bFGF or 20 VEGF) is inserted into a pocket surgically created in the cornea. Angiogenesis is monitored 3 to 5 days later. Ribozymes directed against VEGF-R mRNAs would be delivered in the disk as well, or dropwise to the eye over the time course of the experiment. In another eye model, hypoxia 25 has been shown to cause both increased expression of VEGF and neovascularization in the retina (Pierce et al., 1995 *Proc. Natl. Acad. Sci. USA.* 92: 905-909; Shweiki et al., 1992 *J. Clin. Invest.* 91: 2235-2243).

In human glioblastomas, it has been shown that VEGF 30 is at least partially responsible for tumor angiogenesis (Plate et al., 1992 *Nature* 359, 845). Animal models have been developed in which glioblastoma cells are implanted subcutaneously into nude mice and the progress of tumor growth and angiogenesis is studied (Kim et al., 1993 35 *supra*; Millauer et al., 1994 *supra*).

Another animal model that addresses neovascularization involves Matrigel, an extract of basement membrane that becomes a solid gel when injected subcutaneously (Passaniti et al., 1992 *Lab. Invest.* 67: 519-528). When 5 the Matrigel is supplemented with angiogenesis factors such as VEGF, vessels grow into the Matrigel over a period of 3 to 5 days and angiogenesis can be assessed. Again, ribozymes directed against VEGF-R mRNAs would be delivered in the Matrigel.

10 Several animal models exist for screening of anti-angiogenic agents. These include corneal vessel formation following corneal injury (Burger et al., 1985 *Cornea* 4: 35-41; Lepri, et al., 1994 *J. Ocular Pharmacol.* 10: 273-280; Ormerod et al., 1990 *Am. J. Pathol.* 137: 1243-1252) 15 or intracorneal growth factor implant (Grant et al., 1993 *Diabetologia* 36: 282-291; Pandey et al. 1995 *supra*; Zieche et al., 1992 *Lab. Invest.* 67: 711-715), vessel growth into Matrigel matrix containing growth factors (Passaniti et al., 1992 *supra*), female reproductive organ neovascularization 20 following hormonal manipulation (Shweiki et al., 1993 *Clin. Invest.* 91: 2235-2243), several models involving inhibition of tumor growth in highly vascularized solid tumors (O'Reilly et al., 1994 *Cell* 79: 315-328; Senger et al., 1993 *Cancer and Metas. Rev.* 12: 303-324; 25 Takahasi et al., 1994 *Cancer Res.* 54: 4233-4237; Kim et al., 1993 *supra*), and transient hypoxia-induced neovascularization in the mouse retina (Pierce et al., 1995 *Proc. Natl. Acad. Sci. USA.* 92: 905-909).

The cornea model, described in Pandey et al. *supra*, 30 is the most common and well characterized anti-angiogenic agent efficacy screening model. This model involves an avascular tissue into which vessels are recruited by a stimulating agent (growth factor, thermal or alkalai burn, endotoxin). The corneal model would utilize the intra- 35 stromal corneal implantation of a Teflon pellet soaked in a VEGF-Hydrone solution to recruit blood vessels toward the pellet which can be quantitated using standard microscopic

and image analysis techniques. To evaluate their anti-angiogenic efficacy, ribozymes are applied topically to the eye or bound within Hydron on the Teflon pellet itself. This avascular cornea as well as the Matrigel 5 (see below) provide for low background assays. While the corneal model has been performed extensively in the rabbit, studies in the rat have also been conducted.

The mouse model (Passaniti et al., *supra*) is a non-tissue model which utilizes Matrigel, an extract of 10 basement membrane (Kleinman et al., 1986) or Millipore® filter disk, which can be impregnated with growth factors and anti-angiogenic agents in a liquid form prior to injection. Upon subcutaneous administration at body temperature, the Matrigel or Millipore® filter disk forms 15 a solid implant. VEGF embedded in the Matrigel or Millipore® filter disk would be used to recruit vessels within the matrix of the Matrigel or Millipore® filter disk which can be processed histologically for endothelial cell specific vWF (factor VIII antigen) immunohisto- 20 chemistry, Trichrome-Masson stain, or hemoglobin content. Like the cornea, the Matrigel or Millipore® filter disk are avascular; however, it is not tissue. In the Matrigel or Millipore® filter disk model, ribozymes are administered 25 within the matrix of the Matrigel or Millipore® filter disk to test their anti-angiogenic efficacy. Thus, delivery issues in this model, as with delivery of ribozymes by Hydron-coated Teflon pellets in the rat cornea model, may be less problematic due to the homogeneous presence of the ribozyme within the respective matrix.

30 These models offer a distinct advantage over several other angiogenic models listed previously. The ability to use VEGF as a pro-angiogenic stimulus in both models is highly desirable since ribozymes will target only VEGFr mRNA. In other words, the involvement of other non- 35 specific types of stimuli in the cornea and Matrigel models is not advantageous from the standpoint of understanding the pharmacologic mechanism by which the

anti-VEGFr mRNA ribozymes produce their effects. In addition, the models will allow for testing the specificity of the anti-VEGFr mRNA ribozymes by using either a- or bFGF as a pro-angiogenic factor. Vessel recruitment using FGF 5 should not be affected in either model by anti-VEGFr mRNA ribozymes. Other models of angiogenesis including vessel formation in the female reproductive system using hormonal manipulation (Shweiki et al., 1993 *supra*); a variety of vascular solid tumor models which involve indirect correlations with angiogenesis (O'Reilly et al., 1994 *supra*; Senger et al., 1993 *supra*; Takahasi et al., 1994 *supra*; Kim et al., 1993 *supra*); and retinal neovascularization following transient hypoxia (Pierce et al., 1995 *supra*) were not selected for efficacy screening due to their 10 non-specific nature, although there is a correlation 15 between VEGF and angiogenesis in these models.

Other model systems to study tumor angiogenesis is reviewed by Folkman, 1985 *Adv. Cancer. Res.*.. 43, 175.

flt-1, KDR and/or flk-1 protein levels can be 20 measured clinically or experimentally by FACS analysis. flt-1, KDR and/or flk-1 encoded mRNA levels will be assessed by Northern analysis, RNase-protection, primer extension analysis and/or quantitative RT-PCR. Ribozymes that block flt-1, KDR and/or flk-1 protein encoding mRNAs 25 and therefore result in decreased levels of flt-1, KDR and/or flk-1 activity by more than 20% *in vitro* will be identified.

Ribozymes and/or genes encoding them are delivered by either free delivery, liposome delivery, cationic lipid 30 delivery, adeno-associated virus vector delivery, adeno-virus vector delivery, retrovirus vector delivery or plasmid vector delivery in these animal model experiments (see above).

Patients can be treated by locally administering 35 nucleic acids targeted against VEGF-R by direct injection. Routes of administration may include, but are not limited to, intravascular, intramuscular, subcutaneous, intra-

articular, aerosol inhalation, oral (tablet, capsule or pill form), topical, systemic, ocular, intraperitoneal and/or intrathecal delivery.

Example 11: Ribozyme-mediated inhibition of angiogenesis

5 in vivo

The purpose of this study was to assess the anti-angiogenic activity of hammerhead ribozymes targeted against flt-1 4229 site in the rat cornea model of VEGF induced angiogenesis (see above). These ribozymes have either active or inactive catalytic core and either bind and cleave or just bind to VEGF-R mRNA of the flt-1 subtype. The active ribozymes, that are able to bind and cleave the target RNA, have been shown to inhibit (¹²⁵I-labeled) VEGF binding in cultured endothelial cells and produce a dose-dependent decrease in VEGF induced endothelial cell proliferation in these cells (see Examples 3-5 above). The catalytically inactive forms of these ribozymes, wherein the ribozymes can only bind to the RNA but cannot catalyze RNA cleavage, fail to show these characteristics. The ribozymes and VEGF were co-delivered using the filter disk method: Nitrocellulose filter disks (Millipore®) of 0.057 diameter were immersed in appropriate solutions and were surgically implanted in rat cornea as described by Pandey et al., *supra*. This delivery method has been shown to deliver rhodamine-labeled free ribozyme to scleral cells and, in all likelihood cells of the pericorneal vascular plexus. Since the active ribozymes show cell culture efficacy and can be delivered to the target site using the disk method, it is essential that these ribozymes be assessed for *in vivo* anti-angiogenic activity.

The stimulus for angiogenesis in this study was the treatment of the filter disk with 30 mM VEGF which is implanted within the cornea's stroma. This dose yields reproducible neovascularization stemming from the pericorneal vascular plexus growing toward the disk in a

dose-response study 5 days following implant. Filter disks treated only with the vehicle for VEGF show no angiogenic response. The ribozymes was co-administered with VEGF on a disk in two different ribozyme concentrations. One concern with the simultaneous administration is that the ribozymes will not be able to inhibit angiogenesis since VEGF receptors can be stimulated. However, we have observed that in low VEGF doses, the neovascular response reverts to normal suggesting that the VEGF stimulus is essential for maintaining the angiogenic response. Blocking the production of VEGF receptors using simultaneous administration of anti-VEGF-R mRNA ribozymes could attenuate the normal neovascularization induced by the filter disk treated with VEGF.

15 Materials and Methods:

1. Stock hammerhead ribozyme solutions:

- a. flt-1 4229 (786 μ M) - Active
- b. flt-1 4229 (736 μ M) - Inactive

2. Experimantal solutions/groups:

20	Group 1	Solution 1	Control VEGF solution: 30 μ M in 82 mM Tris base
	Group 2	Solution 2	flt-1 4229 (1 μ g/ μ L) in 30 μ M VEGF/82 mM Tris base
25	Group 3	Solution 3	flt-1 4229 (10 μ g/ μ L) in 30 μ M VEGF/82 mM Tris base
	Group 4	Solution 4	No VEGF, flt-1 4229 (10 μ g/ μ L) in 82 mM Tris base
	Group 5	Solution 5	No VEGF, No ribozyme in 82 mM Tris base

30 10 eyes per group, 5 animals (Since they have similar molecular weights, the molar concentrations should be essentially similar).

Each solution (VEGF and RIBOZYMES) were prepared as a 2X solution for 1:1 mixing for final concentrations

above, with the exception of solution 1 in which VEGF was 2X and diluted with ribozyme diluent (sterile water).

3. VEGF Solutions

The 2X VEGF solution (60 μ M) was prepared from a stock of 0.82 μ g/ μ L in 50 mM Tris base. 200 μ L of VEGF stock was concentrated by speed vac to a final volume of 60.8 μ L, for a final concentration of 2.7 μ g/ μ L or 60 μ M. Six 10 μ L aliquots was prepared for daily mixing. 2X solutions for VEGF and Ribozyme was stored at 4°C until the day of the surgery. Solutions were mixed for each day of surgery. Original 2X solutions was prepared on the day before the first day of the surgery.

4. Surgical Solutions:

Anesthesia:

15 stock ketamine hydrochloride 100 mg/mL
stock xylazine hydrochloride 20 mg/mL
stock acepromazine 10 mg/mL

Final anesthesia solution: 50 mg/mL ketamine, 10 mg/mL xylazine, and 0.5 mg/mL acepromazine
20 5% povidone iodine for ophthalmic surgical wash
2% lidocaine (sterile) for ophthalmic administration (2 drops per eye)
sterile 0.9% NaCl for ophthalmic irrigation

5. Surgical Methods:

25 Standard surgical procedure as described in Pandey et al., *supra*. Filter disks were incubated in 1 μ L of each solution for approximately 30 minutes prior to implantation.

5. Experimental Protocol:

30 The animal cornea were treated with the treatment groups as described above. Animals were allowed to recover for 5 days after treatment with daily observation (scoring 0 - 3). On the fifth day animals were euthanized and

digital images of each eye was obtained for quantitaion using Image Pro Plus. Quantitated neovascular surface area were analyzed by ANOVA followed by two post-hoc tests including Dunnets and Tukey-Kramer tests for significance 5 at the 95% confidence level. Dunnets provide information on the significance between the differences within the means of treatments vs. controls while Tukey-Kramer provide information on the significance of differences within the means of each group.

10 Results are graphically represented in Figure 18. As shown in the figure, flt-1 4229 active hammerhead ribozyme at both concentrations was effective at inhibiting angiogenesis while the inactive ribozyme did not show any significant reduction in angiogenesis. A statistically 15 significant reduction in neovascular surface area was observed only with active ribozymes. This result clearly shows that the ribozymes are capable of significantly inhibiting angiogenesis *in vivo*. Specifically, the mechanism of inhibition appears to be by the binding and 20 cleavage of target RNA by ribozymes.

Diagnostic uses

Ribozymes of this invention may be used as diagnostic tools to examine genetic drift and mutations within diseased cells or to detect the presence of flt-1, KDR 25 and/or flk-1 RNA in a cell. The close relationship between ribozyme activity and the structure of the target RNA allows the detection of mutations in any region of the molecule which alters the base-pairing and three-dimensional structure of the target RNA. By using 30 multiple ribozymes described in this invention, one may map nucleotide changes which are important to RNA structure and function *in vitro*, as well as in cells and tissues. Cleavage of target RNAs with ribozymes may be used to inhibit gene expression and define the role 35 (essentially) of specified gene products in the progression of disease. In this manner, other genetic targets

may be defined as important mediators of the disease. These experiments will lead to better treatment of the disease progression by affording the possibility of combinational therapies (e.g., multiple ribozymes targeted 5 to different genes, ribozymes coupled with known small molecule inhibitors, or intermittent treatment with combinations of ribozymes and/or other chemical or biological molecules). Other *in vitro* uses of ribozymes of this invention are well known in the art, and include 10 detection of the presence of mRNAs associated with flt-1, KDR and/or flk-1 related condition. Such RNA is detected by determining the presence of a cleavage product after treatment with a ribozyme using standard methodology.

In a specific example, ribozymes which can cleave 15 only wild-type or mutant forms of the target RNA are used for the assay. The first ribozyme is used to identify wild-type RNA present in the sample and the second ribozyme will be used to identify mutant RNA in the sample. As reaction controls, synthetic substrates of both wild- 20 type and mutant RNA will be cleaved by both ribozymes to demonstrate the relative ribozyme efficiencies in the reactions and the absence of cleavage of the "non-targeted" RNA species. The cleavage products from the synthetic substrates will also serve to generate size 25 markers for the analysis of wild-type and mutant RNAs in the sample population. Thus each analysis will require two ribozymes, two substrates and one unknown sample which will be combined into six reactions. The presence of cleavage products will be determined using an RNase protection assay so that full-length and cleavage fragments 30 of each RNA can be analyzed in one lane of a polyacrylamide gel. It is not absolutely required to quantify the results to gain insight into the expression of mutant RNAs and putative risk of the desired phenotypic changes in 35 target cells. The expression of mRNA whose protein product is implicated in the development of the phenotype (i.e., flt-1, KDR and/or flk-1) is adequate to establish

risk. If probes of comparable specific activity are used for both transcripts, then a qualitative comparison of RNA levels will be adequate and will decrease the cost of the initial diagnosis. Higher mutant form to wild-type ratios 5 will be correlated with higher risk whether RNA levels are compared qualitatively or quantitatively.

Other embodiments are within the following claims.

Table ICharacteristics of RibozymesGroup I Introns

Size: ~200 to >1000 nucleotides

5 Requires a U in the target sequence immediately 5' of the cleavage site.

Binds 4-6 nucleotides at 5' side of cleavage site.

Over 75 known members of this class. Found in *Tetrahymena thermophila* rRNA, fungal mitochondria, chloroplasts, phage

10 T4, blue-green algae, and others.

RNaseP RNA (M1 RNA)

Size: ~290 to 400 nucleotides

RNA portion of a ribonucleoprotein enzyme. Cleaves tRNA precursors to form mature tRNA.

15 Roughly 10 known members of this group all are bacterial in origin.

Hammerhead Ribozyme

Size: ~13 to 40 nucleotides.

Requires the target sequence UH immediately 5' of the cleavage site.

Binds a variable number of nucleotides on both sides of the cleavage site.

14 known members of this class. Found in a number of plant pathogens (virusoids) that use RNA as the infectious

25 agent (Figure 1 and 2)

Hairpin Ribozyme

Size: ~50 nucleotides.

Requires the target sequence GUC immediately 3' of the cleavage site.

30 Binds 4-6 nucleotides at 5' side of the cleavage site and a variable number to the 3' side of the cleavage site.

Only 3 known member of this class. Found in three plant pathogen (satellite RNAs of the tobacco ringspot virus,

arabis mosaic virus and chicory yellow mottle virus) which uses RNA as the infectious agent (Figure 3).

Hepatitis Delta Virus (HDV) Ribozyme

Size: 50-60 nucleotides (at present)

5 Sequence requirements not fully determined.
 Binding sites and structural requirements not fully determined, although no sequences 5' of cleavage site are required.
 Only 1 known member of this class. Found in human HDV
 10 (Figure 4).

Neurospora VS RNA Ribozyme

Size: ~144 nucleotides (at present)

Cleavage of target RNAs recently demonstrated.
 Sequence requirements not fully determined.
 15 Binding sites and structural requirements not fully determined. Only 1 known member of this class. Found in *Neurospora* VS RNA (Figure 5).

Table II: Human flt1 VEGF Receptor-Hammerhead Ribozyme and Substrate Sequence

20	nt.	HH Ribozyme	Substrate
	Posi-		
	tion		
	10	GCCGAGAG CUGAUGA X GAA AGUGUCCG	CGGACACUC CUCUCGGC
	13	GGAGCCGA CUGAUGA X GAA AGGAGUGU	ACACUCCUC UCGGCUCC
25	15	GAGGAGCC CUGAUGA X GAA AGAGGAGU	ACUCCUCUC GGCUCCUC
	20	CCGGGGAG CUGAUGA X GAA AGCCGAGA	UCUCGGCUC CUCCCCGG
	23	CUGCCTGG CUGAUGA X GAA AGGAGCCG	CGGCUCCUC CCCGGCAG
	43	CCCGCUCC CUGAUGA X GAA AGCCGCCG	CGGCGGCUC GGAGCGGG
	54	GAGCCCCG CUGAUGA X GAA AGCCCFCU	AGCGGGCUC CGGGGCUC
30	62	CUGCACCC CUGAUGA X GAA AGCCCCGG	CCGGGGCUC GGGUGGCAG
	97	CCCCGGGU CUGAUGA X GAA AUCCUCGC	GCGAGGAUU ACCCGGGG
	98	UCCCCGGG CUGAUGA X GAA AAUCCUCG	CGAGGAUUA CCCGGGGA

	113	CAGGAGAC CUGAUGA X GAA ACCACUUC	GAAGUGGUU GUCUCCUG
	116	AGCCAGGA CUGAUGA X GAA ACAACCAC	GUGGUUGUC UCCUGGCU
	118	CCAGCCAG CUGAUGA X GAA AGACAACC	GGUJUGUCUC CUGGCUGG
	145	CGCGCCCU CUGAUGA X GAA AGCGCCCG	CGGGCGCUC AGGGCGCG
5	185	GGCCGCCA CUGAUGA X GAA AGUCCGUC	GACGGACUC UGGCGGCC
	198	CGGCCAAC CUGAUGA X GAA ACCCGGCC	GGCCGGGUC GUUGGCCG
	201	CCCCGGCC CUGAUGA X GAA ACGACCCG	CGGGUCGUU GGCCGGGG
	240	GUGAGCGC CUGAUGA X GAA ACGCGGCC	GGCCGCGUC GCGCUCAC
	246	ACCAUGGU CUGAUGA X GAA AGCGCGAC	GUCGCGCUC ACCAUGGU
10	255	CAGUAGCU CUGAUGA X GAA ACCAUGGU	ACCAUGGU ACCUACUG
	260	UGUCCCAG CUGAUGA X GAA AGCUGACC	GGUCAGCUA CUGGGACA
	276	CACAGCAG CUGAUGA X GAA ACCCCGGU	ACCGGGGUC CUGCUGUG
	294	AGACAGCU CUGAUGA X GAA AGCAGCGC	GCGCUGCUC AGCUGUCU
	301	GAGAAGCA CUGAUGA X GAA ACAGCUGA	UCAGCUGUC UGCUUCUC
15	306	CCUGUGAG CUGAUGA X GAA AGCAGACA	UGUCUGCUU CUCACAGG
	307	UCCUGUGA CUGAUGA X GAA AAGCAGAC	GUCUGCUUC UCACAGGA
	309	GAUCCUGU CUGAUGA X GAA AGAACAG	CUGCUUCUC ACAGGAUC
	317	CUGAACUA CUGAUGA X GAA AUCCUGUG	CACAGGAUC UAGUUCAG
	319	ACCUGAAC CUGAUGA X GAA AGAUCCUG	CAGGAUCUA GUUCAGGU
20	322	UGAACCUUG CUGAUGA X GAA ACUAGAUC	GAUCUAGUU CAGGUUCA
	323	UUGAACCU CUGAUGA X GAA AACUAGAU	AUCUAGUUC AGGUUCAA
	328	UAAUUUUG CUGAUGA X GAA ACCUGAAC	GUUCAGGUU CAAAAUUA
	329	UUAUUUU CUGAUGA X GAA AACUGAA	UUCAGGUUC AAAAUUA
	335	GAUCUUUU CUGAUGA X GAA AUUJUGAA	UUCAAAAUU AAAAGAUC
25	336	GGAUCUUU CUGAUGA X GAA AAUUUUGA	UCAAAAUU AAAGAUCC
	343	CAGUUCAG CUGAUGA X GAA AUCUUUUA	UAAAAGAUC CUGAACUG
	355	GCCUUUUUA CUGAUGA X GAA ACUCAGUU	AACUGAGUU UAAAAGGC
	356	UGCCUUUU CUGAUGA X GAA AACUCAGU	ACUGAGUUU AAAAGGCA
	357	GUGCCUUU CUGAUGA X GAA AAACUCAG	CUGAGUUUA AAAGGCAC
30	375	GCUUGCAU CUGAUGA X GAA AUGUGCUG	CAGCACAU CUGCAAGC
	400	GCAUJUGGA CUGAUGA X GAA AUGCAGUG	CACUGCAUC UCCAAUGC
	402	CUGCAUUG CUGAUGA X GAA AGAUGCAG	CUGCAUCUC CAAUGCAG
	427	AGACCAUU CUGAUGA X GAA AUGGGCUG	CAGCCCAUA AAUGGUCU

	434	CAGGCCAA CUGAUGA X GAA ACCAUUUA	UAAAUGGUC UUUGCCUG
	436	UUCAGGCA CUGAUGA X GAA AGACCAUU	AAUGGUCUU UGCCUGAA
	437	UUUCAGGC CUGAUGA X GAA AAGACCAU	AUGGUCUUU GCCUGAAA
	454	GCUUUCCU CUGAUGA X GAA ACUCACCA	UGGUGAGUA AGGAAAGC
5	477	GAUUUAGU CUGAUGA X GAA AUGCUCAG	CUGAGCAUA ACUAAAUC
	481	GGCAGAUU CUGAUGA X GAA AGUUAUGC	GCAUAACUA AAUCUGCC
	485	CACAGGCA CUGAUGA X GAA AUUUAGUU	AACUAAAUC UGCCUGUG
	512	UACUGGAG CUGAUGA X GAA AUUGUUUG	CAAACAAUU CUGCAGUA
	513	GUACUGCA CUGAUGA X GAA AAUUGUUU	AAACAAUUC UGCAGUAC
10	520	GGUUAAAG CUGAUGA X GAA ACUGCAGA	UCUGCAGUA CUUJAACC
	523	CAAGGUUA CUGAUGA X GAA AGUACUGC	GCAGUACUU UAACCUUG
	524	UCAAGGUU CUGAUGA X GAA AAGUACUG	CAGUACUUU AACCUUGA
	525	UUCAAGGU CUGAUGA X GAA AAAGUACU	AGUACUUUA ACCUUGAA
	530	CUGUGUUC CUGAUGA X GAA AGGUUAAA	UUUAACCUU GAACACAG
15	541	GUUUGCuu CUGAUGA X GAA AGCUGUGU	ACACAGCUC AAGCAAAC
	560	AGCUGUAG CUGAUGA X GAA AGCCAGUG	CACUGGCUU CUACAGCU
	561	CAGCUGUA CUGAUGA X GAA AAGCCAGU	ACUGGCuUC UACAGCUG
	563	UGCAGCUG CUGAUGA X GAA AGAACCCA	UGGCUUCUA CAGCUGCA
	575	CAGCUAGA CUGAUGA X GAA AUUUGCAG	CUGCAAAUA UCUAGCUG
20	577	UACAGCUA CUGAUGA X GAA AUAUUGC	GCAAAUAUC UAGCUGUA
	579	GGUACAGC CUGAUGA X GAA AGAUAUUU	AAUAUCAUA GCUGUACC
	585	GAAGUAGG CUGAUGA X GAA ACAGCUAG	CUAGCUGUA CCUACUUC
	589	CUUUGAAG CUGAUGA X GAA AGGUACAG	CUGUACCUA CUUCAAAG
	592	CUUCUUUG CUGAUGA X GAA AGUAGGUA	UACCUACUU CAAAGAAG
25	593	UCUUCUUU CUGAUGA X GAA AAGUAGGU	ACCUACUUC AAAGAAGA
	614	AGAUUGCA CUGAUGA X GAA AUUCUGUU	AACAGAAUC UGCAAUCU
	621	AAUAAUUA CUGAUGA X GAA AUUGCAGA	UCUGCAAUC UAUAIUUU
	623	UAAAUAUA CUGAUGA X GAA AGAUUGCA	UGCAAUCUA UAUAIUUU
	625	AAUAAAUA CUGAUGA X GAA AUAGAUUG	CAAUCUAUA UAUJUAUU
30	627	CUAAUAAA CUGAUGA X GAA AUAUAGAU	AUCUAUUA UUUJUUAG
	629	CACUAAUA CUGAUGA X GAA AUAUAUAG	CUAAUAAUU UAUJAGUG
	630	UCACUAAU CUGAUGA X GAA AAUAAUUA	UAAUAAUUU AUJAGUGA
	631	AUCACUAA CUGAUGA X GAA AAAUAAU	UAUAUUUUA UUAGUGAU

	633	GUAUCACU CUGAUGA X GAA AUAAAUAU	AUAUUUAUU AGUGAUAC
	634	UGUAUCAC CUGAUGA X GAA AAUAAAUA	UAUUUAUUA GUGAUACA
	640	UCUACCUG CUGAUGA X GAA AUCACUAA	UUAGUGAUU CAGGUAGA
	646	GAAAGGUC CUGAUGA X GAA ACCUGUAU	AUACAGGUA GACCUUUC
5	652	CUCUACGA CUGAUGA X GAA AGGUCUAC	GUAGACCUU UCGUAGAG
	653	UCUCUACG CUGAUGA X GAA AAGGUCUA	UAGACCUUU CGUAGAGA
	654	AUCUCUAC CUGAUGA X GAA AAAGGUCU	AGACCUUUC GUAGAGAU
	657	UACAUCUC CUGAUGA X GAA ACGAAAGG	CCUUUCGUA GAGAUGUA
	665	UUUCACUG CUGAUGA X GAA ACAUCUCU	AGAGAUGUA CAGUGAAA
10	675	AUUUCGGG CUGAUGA X GAA AUUUCACU	AGUGAAAUC CCCGAAAU
	684	AUGUGUAU CUGAUGA X GAA AUUUCGGG	CCCGAAAUU AUACACAU
	685	CAUGUGUA CUGAUGA X GAA AAUUUCGG	CCGAAAUA UACACAUG
	687	GUCAUGUG CUGAUGA X GAA AUAAUUUC	GAAAUUAUA CACAUGAC
	711	GGAAUGAC CUGAUGA X GAA AGCUCCU	AGGGAGCUC GUCAUUCC
15	714	CAGGGAAU CUGAUGA X GAA ACGAGCUC	GAGCUCGUC AUUCCCUG
	717	CGGCAGGG CUGAUGA X GAA AUGACGAG	CUCGUCAUU CCCUGCCG
	718	CCGGCAGG CUGAUGA X GAA AAUGACGA	UCGUCAUUC CCUGCCGG
	729	GGUGACGU CUGAUGA X GAA ACCCGGCA	UGCCGGGUU ACGUCACC
	730	AGGUGACG CUGAUGA X GAA AACCCGGC	GCCGGGUUA CGUCACCU
20	734	UGUUUAGGU CUGAUGA X GAA ACGUAACC	GGUUACGUC ACCUAACA
	739	AGUGAUGU CUGAUGA X GAA AGGUGACG	CGUCACCUA ACAUCACU
	744	GUAACAGU CUGAUGA X GAA AUGUUAGG	CCUAACAUU ACUGUUAC
	750	UUAAAAGU CUGAUGA X GAA ACAGUGAU	AUCACUGUU ACUUUAAA
	751	UUUUAAAAG CUGAUGA X GAA AACAGUGA	UCACUGUUA CUUUAAA
25	754	CUUUUUUA CUGAUGA X GAA AGUAACAG	CUGUUACUU UAAAAAAG
	755	ACUUUUUU CUGAUGA X GAA AAGUAACA	UGUUACUUU AAAAAGU
	756	AACUUUUU CUGAUGA X GAA AAAGUAAC	GUUACUUUA AAAAAGUU
	764	CAAGUGGA CUGAUGA X GAA ACUUUUU	AAAAAGUUU UCCACUUG
	765	UCAAGUGG CUGAUGA X GAA AACUUUUU	AAAAAGUUU CCACUUGA
30	766	GUCAAGUG CUGAUGA X GAA AAACUUUU	AAAAGUUUC CACUUGAC
	771	AAAGUGUC CUGAUGA X GAA AGUGGAAA	UUUCCACUU GACACUJJ
	778	AGGGAUCA CUGAUGA X GAA AGUGUCAA	UUGACACUU UGAUCCU
	779	CAGGGAUC CUGAUGA X GAA AAGUGUCA	UGACACUUU GAUCCUG

783	CCAUCAGG CUGAUGA X GAA AUCAAAGU	ACUUUGAUC CCUGAUGG
801	UCCCGAGAU CUGAUGA X GAA AUGCCUUU	AAACGCAUA AUCUGGGGA
804	CUGUCCCCA CUGAUGA X GAA AUUAUGCG	CGCAUAAAUC UGGGACAG
814	GCCCUUUC CUGAUGA X GAA ACUGUCCC	GGGACAGUA GAAAGGGC
5	824 AUAUGAUG CUGAUGA X GAA AGCCCUUU	AAAGGGCUU CAUCAUAU
825	GAU AUGAU CUGAUGA X GAA AAGCCUU	AAGGGCUUC AUCAUAUC
828	UUUGAUAU CUGAUGA X GAA AUGAAGCC	GGCUUCAUC AUAUCAAA
831	GCAUUUGA CUGAUGA X GAA AUGAUGAA	UUCAUCAUA UCAAAUGC
833	UUGCAUUU CUGAUGA X GAA AUAUGAUG	CAUCAUAUC AAAUGCAA
10	845 UUUCUUUG CUGAUGA X GAA ACGUUGCA	UGCAACGUA CAAAGAAA
855	AGAAGCCC CUGAUGA X GAA AUUUCUUU	AAAGAAAUA GGGCUUCU
861	CAGGU CAG CUGAUGA X GAA AGCCC UAU	AUAGGGCUU CUGACCUG
862	ACAGGUCA CUGAUGA X GAA AAGCCC UAU	UAGGGCUUC UGACCUGU
882	UGCCCAUU CUGAUGA X GAA ACUGUJGC	GCAACAGUC AAUGGGCA
15	892 CUUAUACA CUGAUGA X GAA AUGCCC AU	AUGGGCAUU UGUUAUAG
893	UCUUUAUAC CUGAUGA X GAA AAUGCCC A	UGGGCAUUU GUUAAGA
896	UUGUCUUA CUGAUGA X GAA ACAAAUGC	GCAUUUGUA UAAGACAA
898	GUUUGUCU CUGAUGA X GAA AUACAAA U	AUUUGUAUA AGACAAAC
908	GUGUGAGA CUGAUGA X GAA AGUUUGUC	GACAAACUA UCUCACAC
20	910 AUGUGUGA CUGAUGA X GAA AUAGUUU JG	CAAACUAUC UCACACAU
912	CGAUGUGU CUGAUGA X GAA AGAUAGUU	AACUAUCUC ACACAUCG
919	GGUUUGUC CUGAUGA X GAA AUGUGUGA	UCACACAU C GACAAACC
931	UAUGAUUG CUGAUGA X GAA AUUGGUUU	AAACCAAUA CAAUCAUA
936	ACAUCUAU CUGAUGA X GAA AUUGUAUU	AAUACAAUC AUAGAUGU
25	939 UGGACAUC CUGAUGA X GAA AUGAUUGU	ACAAUCAUA GAUGUCCA
945	CUUAUUUG CUGAUGA X GAA ACAUCUAU	AUAGAUGUC CAAAUAAG
951	GGUGUGCU CUGAUGA X GAA AUUUGGC	GUCCAAAUA AGCACACC
969	AGUAAUUU CUGAUGA X GAA ACUGGGCG	CGCCCAGUC AAAUACU
974	CUCUAAGU CUGAUGA X GAA AUUUGACU	AGUAAA UU ACUUAGAG
30	975 CCUCUAAG CUGAUGA X GAA AUUUGAC	GUCAAAUUA CUUAGAGG
978	UGGCCUCU CUGAUGA X GAA AGUAAUU	AAA UUACUU AGAGGCCA
979	AUGGCCUC CUGAUGA X GAA AAGUAAUU	AAUUACUA GAGGCCAU
988	GACAAGAG CUGAUGA X GAA AUGGCCUC	GAGGCCAU CUCUUGUC

991	GAGGACAA CUGAUGA X GAA AGUAUGGC	GCCAUACUC UUGUCCUC
993	UUGAGGAC CUGAUGA X GAA AGAGUAUG	CAUACUCUU GUCCUCAA
996	CAAUUGAG CUGAUGA X GAA ACAAGAGU	ACUCUJUGUC CUCAAUUG
999	GUACAAUU CUGAUGA X GAA AGGACAAG	CUUGUCCUC AAUUGUAC
5 1003	AGCAGUAC CUGAUGA X GAA AUJGAGGA	UCCUCAUJJ GUACUGCU
1006	GGUAGCAG CUGAUGA X GAA ACAAUUGA	UCAAUJUGUA CUGCUACC
1012	GGGAGUGG CUGAUGA X GAA AGCAGUAC	GUACUGCUA CCACUCCC
1018	GUUCAAGG CUGAUGA X GAA AGUGGUAG	CUACACUC CCUUGAAC
1022	UCGUGUUC CUGAUGA X GAA AGGGAGUG	CACUCCUU GAACACGA
10 1035	GUCAUJUG CUGAUGA X GAA ACUCUCGU	ACGAGAGUJ CAAAUGAC
1036	GGUCAUUU CUGAUGA X GAA AACUCUCG	CGAGAGUUC AAAUGACC
1051	AUCAGGGU CUGAUGA X GAA ACUCCAGG	CTUGGAGUU ACCCUGAU
1052	CAUCAGGG CUGAUGA X GAA AACUCCAG	CUGGAGUUA CCCUGAUG
1069	AGCUCUCU CUGAUGA X GAA AUUUUUUU	AAAAAAAUA AGAGAGCU
15 1078	CCUUACGG CUGAUGA X GAA AGCUCUCU	AGAGAGCUU CCGUAAGG
1079	GCCUUACG CUGAUGA X GAA AAGCUCUC	GAGAGCUUC CGUAAGGC
1083	CGUCGCCU CUGAUGA X GAA ACGGAAGC	GCUUCCGUA AGGCGACG
1095	CUUUGGUC CUGAUGA X GAA AUUCGUUG	CGACGAAUU GACCAAAG
1108	GGCAUGGG CUGAUGA X GAA AUUGCJUU	AAAGCAAUU CCCAUGCC
20 1109	UGGCAUGG CUGAUGA X GAA AAUUGCJU	AAGCAAUUC CCAUGCCA
1122	CUGUAGAA CUGAUGA X GAA AUGUJUGG	GCCAACAUU UUCUACAG
1124	CACUGUAG CUGAUGA X GAA AUAUGUUG	CAACAUAUU CUACAGUG
1125	ACACUGUA CUGAUGA X GAA AAUAUGUU	AACAUAUUC UACAGUGU
1127	GAACACUG CUGAUGA X GAA AGAAUAUG	CAUAUJCUA CAGUGUUC
25 1134	AUAGUAAG CUGAUGA X GAA ACACUGUA	UACAGUGUU CUUACUAU
1135	AAUAGUAA CUGAUGA X GAA AACACUGU	ACAGUGUUC UUACUAUU
1137	UCAAUAGU CUGAUGA X GAA AGAACACU	AGUGUUCUU ACUAUUGA
1138	GUCAAUAG CUGAUGA X GAA AAGAACAC	GUGUUCUUA CUAUUGAC
1141	UUUGUCAA CUGAUGA X GAA AGUAAGAA	UUCUUACUA UUGACAAA
30 1143	AUUUUGUC CUGAUGA X GAA AUAGUAAG	CUUACUAUU GACAAAAU
1173	CAAGUAUA CUGAUGA X GAA AGUCCUUJ	AAAGGACUU UAUACUUG
1174	ACAAGUAU CUGAUGA X GAA AAGUCCUU	AAGGACUUU AUACUJUGU
1175	GACAAGUA CUGAUGA X GAA AAAGUCCU	AGGACUUUA UACUJUGUC

	1177	ACGACAAG CUGAUGA X GAA AUAAAGUC	GACUUUAUA CUUGUCGU
	1180	UACACGAC CUGAUGA X GAA AGUUAAAA	UUJAUACUU GUCGUGUA
	1183	CCUUACAC CUGAUGA X GAA ACAAGUAU	AUACUUGUC GUGUAAGG
	1188	CCACUCCU CUGAUGA X GAA ACACGACA	UGUCGUGUA AGGAGUGG
5	1202	AUJUGAAU CUGAUGA X GAA AUGGUCCA	UGGACCAUC AUUCAAU
	1205	CAGAUUUG CUGAUGA X GAA AUGAUGGU	ACCAUCAUU CAAAUCUG
	1206	ACAGAUUU CUGAUGA X GAA AAUGAUGG	CCAUCAUUC AAAUCUGU
	1211	UGUUAACA CUGAUGA X GAA AUUUGAAU	AUUCAAUAUC UGUUAACA
	1215	GAGGUGUU CUGAUGA X GAA ACAGAUUU	AAAUCUGUU AACACCUC
10	1216	UGAGGUGU CUGAUGA X GAA AACAGAUU	AAUCUGUUA ACACCUCA
	1223	UAUGCACU CUGAUGA X GAA AGGUGUUA	UAACACCUC AGUGCAUA
	1231	AUCAUUA CUGAUGA X GAA AUGCACUG	CAGUGCAUA UAU AUGAU
	1233	UUAUCAUA CUGAUGA X GAA AUAUGCAC	GUGCAUUAUA UAUGAUAA
	1235	CUUUAUCA CUGAUGA X GAA AUUAUGC	GCAUUAUAUA UGAUAAAG
15	1240	GAAUGCuu CUGAUGA X GAA AUCAUUA	UAUAUGAUUA AAGCAUJC
	1247	CAGUGAUG CUGAUGA X GAA AUGCUUUA	UAAAGCAUU CAUCACUG
	1248	ACAGUGAU CUGAUGA X GAA AAUGCUUU	AAAGCAUJC AUCACUGU
	1251	UUCACAGU CUGAUGA X GAA AUGAAUGC	GCAUUCAUC ACUGUGAA
	1264	CUGUUUUC CUGAUGA X GAA AUGUUUCA	UGAAACAUUC GAAAACAG
20	1281	ACGGUUUC CUGAUGA X GAA AGCACCUG	CAGGUGCUU GAAACCGU
	1290	UUGCCAGC CUGAUGA X GAA ACGGUUUC	GAAACCGUA GCUGGC
	1304	GCCGGUAA CUGAUGA X GAA ACCGCUUG	CAAGCGGUC UUACCGGC
	1306	GAGCCGGU CUGAUGA X GAA AGACCGCU	AGCGGUCUU ACCGGCUC
	1307	AGAGCCGG CUGAUGA X GAA AAGACCGC	GCGGUCUUA CCGGCUCU
25	1314	UUCAUAGA CUGAUGA X GAA AGCCGGUA	UACCGGCUC UCUAUGAA
	1316	CUUUAUA CUGAUGA X GAA AGAGCCGG	CCGGCUCUC UAUGAAAG
	1318	CACUUUCA CUGAUGA X GAA AGAGAGCC	GGCUCUCUA UGAAAGUG
	1334	GCGAGGG A CUGAUGA X GAA AUGCCUUC	GAAGGCAUU UCCCUCGC
	1335	GGCGAGGG CUGAUGA X GAA AAUGCCUU	AAGGCAUUU CCCUCGCC
30	1336	CGGCGAGG CUGAUGA X GAA AAAUGCCU	AGGCAUUJC CCUCGCC
	1340	CUUCCGGC CUGAUGA X GAA AGGGAAAU	AUUUCCUC GCCGGAAG
	1350	AACCAUAC CUGAUGA X GAA ACUUCGG	CCGGAAGUU GUAUGGUU
	1353	UUUAACCA CUGAUGA X GAA ACAACUUC	GAAGUUGUA UGGUAAA

1358	CAUCUUU CUGAUGA X GAA ACCAUACA	UGUAUGGUU AAAAGAUG
1359	CCAUCUU CUGAUGA X GAA AACCAUAC	GUAUGGUUA AAAGAUGG
1370	UCGCAGGU CUGAUGA X GAA ACCCAUCU	AGAUGGGUU ACCUGCGA
1371	GUCGCAGG CUGAUGA X GAA AACCCAUC	GAUGGGUUA CCUGCGAC
5	1388 AGCGAGCA CUGAUGA X GAA AUUUCUCA	UGAGAAAUC UGCUCGCU
	1393 CAAAUAGC CUGAUGA X GAA AGCAGAUU	AAUCUGCUC GCUAUUUG
	1397 GAGUAAA CUGAUGA X GAA AGCGAGCA	UGCUCGCUA UUUGACUC
	1399 ACGAGUCA CUGAUGA X GAA AUAGCGAG	CUCGCUAUU UGACUCGU
10	1400 CACGAGUC CUGAUGA X GAA AAUAGCGA	UCGCUAUUU GACUCGUG
	1405 GUAGCCAC CUGAUGA X GAA AGUAAAUA	AUUUGACUC GUUGCUAC
	1412 UUAACGAG CUGAUGA X GAA AGCCACGA	UCGUGGCUA CUCGUUAA
	1415 UAAUUAAC CUGAUGA X GAA AGUAGCCA	UGGCUACUC GUUAUUA
	1418 UGAUAAAU CUGAUGA X GAA ACGAGUAG	CUACUCGUU AAUUAUCA
	1419 UUGAUAAU CUGAUGA X GAA AACGAGUA	UACUCGUUA AUUAUCAA
15	1422 UCCUUGAU CUGAUGA X GAA AUUAACGA	UCGUUAAUU AUCAAGGA
	1423 GUCCUUGA CUGAUGA X GAA AAUUAACG	CGUUAAUUA UCAAGGAC
	1425 ACCGUCCU CUGAUGA X GAA AUAAUUA	UUAUUAUC AAGGACGU
	1434 UCUUCAGU CUGAUGA X GAA ACGUCCU	AAGGACGUA ACUGAAGA
	1456 GAUUGUAU CUGAUGA X GAA AUUCCUG	CAGGGAAUU AUACAAUC
20	1457 AGAUUGUA CUGAUGA X GAA AAUCCCCU	AGGGAAUUA UACAAUCU
	1459 CAAGAUUG CUGAUGA X GAA AUAAUUCC	GGAAUUAUA CAAUCUUG
	1464 CUCAGCAA CUGAUGA X GAA AUUGUAAA	UAUACAAUC UUGCUGAG
	1466 UGCUCAGC CUGAUGA X GAA AGAUUGUA	UACAAUCUU GCUGAGCA
	1476 GACUGUUU CUGAUGA X GAA AUGCUCAG	CUGAGCAUA AAACAGUC
25	1484 ACACAUUU CUGAUGA X GAA ACUGUUUU	AAAACAGUC AAAUGUGU
	1493 GGUUUUUA CUGAUGA X GAA ACACAUUU	AAAUGUGUU UAAAAACC
	1494 AGGUUUUU CUGAUGA X GAA AACACAUU	AAUGUGUUU AAAAACCU
	1495 GAGGUUUU CUGAUGA X GAA AAACACAU	AUGUGUUUA AAAACCUC
	1503 GUGGCAGU CUGAUGA X GAA AGGUUUUU	AAAAACCUC ACUGCCAC
30	1513 GACAAUUA CUGAUGA X GAA AGUGGCAG	CUGCCACUC UAAUUGUC
	1515 UUGACAAU CUGAUGA X GAA AGAGUGGC	GCCACUCUA AUUGUCAA
	1518 ACAUUGAC CUGAUGA X GAA AUUAGAGU	ACUCUAAUU GUCAAUGU
	1521 UUCACAUU CUGAUGA X GAA ACAAUUAG	CUAAUJUGUC AAUGUGAA

1539	UUUUCGUA CUGAUGA X GAA AUCUGGG	CCCCAGAUU UACGAAAA
1540	CUUUUCGU CUGAUGA X GAA AAUCUGGG	CCCATGAAUU ACGAAAAG
1541	CCUUUUCG CUGAUGA X GAA AAAUCUGG	CCAGAUUUA CGAAAAGG
1556	GAAACGAU CUGAUGA X GAA ACACGGCC	GGCCGUGUC AUCGUUUC
5	1559 CUGGAAAC CUGAUGA X GAA AUGACACG	CGUGUCAUC GUUCCAG
	1562 GGUCUGGA CUGAUGA X GAA ACGAUGAC	GUCAUCGUU UCCAGACC
	1563 GGGUCUGG CUGAUGA X GAA AACGAUGA	UCAUCGUUU CCAGACCC
	1564 CGGGUCUG CUGAUGA X GAA AAACGAUG	CAUCGUUUC CAGACCCG
	1576 UGGGUAGA CUGAUGA X GAA AGCCGGGU	ACCCGGCUC UCUACCCA
10	1578 AGUGGGUA CUGAUGA X GAA AGAGCCGG	CCGGCUCUC UACCCACU
	1580 CCAGUGGG CUGAUGA X GAA AGAGAGCC	GGCUCUCUA CCCACUGG
	1602 CAAGUCAG CUGAUGA X GAA AUUUGUCU	AGACAAAUC CUGACUUG
	1609 UGCGGUAC CUGAUGA X GAA AGUCAGGA	UCCUGACUU GUACCGCA
	1612 AUAUGCGG CUGAUGA X GAA ACAAGUCA	UGACUUGUA CCGCAUAAU
15	1619 GGAUACCA CUGAUGA X GAA AUGCGGU	UACCGCAUA UGGUAUCC
	1624 UUGAGGGA CUGAUGA X GAA ACCAU AUG	CAUAUGGUUA UCCCUCAA
	1626 GGUUGAGG CUGAUGA X GAA AUACCAUA	UAUGGUAUC CCUCAACC
	1630 UGUAGGUU CUGAUGA X GAA AGGGAUAC	GUAUCCCUC AACCUACA
	1636 CUUGAUUG CUGAUGA X GAA AGGUUGAG	CUCAACCUA CAAUCAAG
20	1641 AACCACUU CUGAUGA X GAA AUUGUAGG	CCUACAAUC AAGUGGUU
	1649 GGUGCCAG CUGAUGA X GAA ACCACUUG	CAAGUGGUU CUGGCACC
	1650 GGGUGCCA CUGAUGA X GAA AACCA CUU	AAGUGGUUC UGGCACCC
	1663 AUUAUGGU CUGAUGA X GAA ACAGGGGU	ACCCCUGUA ACCAUAAU
	1669 GGA AUGAU CUGAUGA X GAA AUGGUUAC	GUACCAUA AUCAUUCC
25	1672 UUCGGAAU CUGAUGA X GAA AUUAUGGU	ACCAUAAUC AUUCCGAA
	1675 UGCUUCGG CUGAUGA X GAA AUGAUUAU	AUAAUCAUU CCGAAGCA
	1676 UUGCUUCG CUGAUGA X GAA AAUGAUUA	UAAUCAUUC CGAAGCAA
	1694 UGGAACAA CUGAUGA X GAA AGUCACAC	GUGUGACUU UGUUCCCA
	1695 UUGGAACA CUGAUGA X GAA AAGUCACA	UGUGACUUU UGUUCCAA
30	1696 AUUGGAAC CUGAUGA X GAA AAAGUCAC	GUGACUUUU GUUCCAAU
	1699 AUUAUUGG CUGAUGA X GAA ACAAAAGU	ACUUUUGUU CAAUAAU
	1700 CAUUAUUG CUGAUGA X GAA AACAAAAG	CUUUUGUUC CAAUAAUG
	1705 CUCUUCAU CUGAUGA X GAA AUUGGAAC	GUUCCAAUA AUGAAGAG

1715	GGAUAAAG CUGAUGA X GAA ACUCUUCA	UGAAGAGUC CUUUAUCC
1718	CCAGGAUA CUGAUGA X GAA AGGACUCU	AGAGUCCUU UAUCUCCUGG
1719	UCCAGGAU CUGAUGA X GAA AAGGACUC	GAGUCCUUU AUCCUGGA
1720	AUCCAGGA CUGAUGA X GAA AAAGGACU	AGUCCUUUA UCCUGGAU
5	1722 GCAUCCAG CUGAUGA X GAA AUAAAGGA	UCCUUUAUC CUGGAUGC
	1755 AUGCUCUC CUGAUGA X GAA AUUCUGUU	AACAGAAUU GAGAGCAU
	1764 CGCUGAGU CUGAUGA X GAA AUGCUCUC	GAGAGCAUC ACUCAGCG
	1768 CAUGCGCU CUGAUGA X GAA AGUGAUGC	GCAUCACUC AGCGCAUG
	1782 CCUUCUAU CUGAUGA X GAA AUUGCCAU	AUGGCAAUA AUAGAAGG
10	1785 UUUCCUUC CUGAUGA X GAA AUUAUUGC	GCAUAAUA GAAGGAAA
	1798 AGCCAUCU CUGAUGA X GAA AUUCUUUC	GAAAGAAUA AGAUGGCCU
	1807 CAAGGUGC CUGAUGA X GAA AGCCAUCU	AGAUGGCUA GCACCUJUG
	1814 CCACAAACC CUGAUGA X GAA AGGUGCUA	UAGCACCUU GGUUGUGG
	1818 UCAGCCAC CUGAUGA X GAA ACCAAGGU	ACCUUGGUU GUGGCUGA
15	1829 AAAUUCUA CUGAUGA X GAA AGUCAGCC	GGCUGACUC UAGAAUUU
	1831 AGAAAUC CUGAUGA X GAA AGAGUCAG	CUGACUCUA GAAUUCU
	1836 AUUCCAGA CUGAUGA X GAA AUUCUAGA	UCUAGAAUU UCUGGAAU
	1837 GAUUCCAG CUGAUGA X GAA AAUUCUAG	CUAGAAUUU CUGGAAUC
	1838 AGAUUCCA CUGAUGA X GAA AAAUUCUA	UAGAAUUUC UGGAAUCU
20	1845 CAAAUGUA CUGAUGA X GAA AUUCCAGA	UCUGGAAUC UACAUUUG
	1847 UGCAAAUG CUGAUGA X GAA AGAUUCCA	UGGAAUCUA CAUUGCA
	1851 GCUAUGCA CUGAUGA X GAA AUGUAGAU	AUCUACAUU UGCAUAGC
	1852 AGCUAUGC CUGAUGA X GAA AAUGUAGA	UCUACAUU GCAUAGCU
	1857 UUGGAAGC CUGAUGA X GAA AUGCAAAU	AUUUGCAUA GCUUCCAA
25	1861 UUUAUUUGG CUGAUGA X GAA AGCUAUGC	GCAUAGCUU CCAAUAAA
	1862 CUUUAUUG CUGAUGA X GAA AAGCUAUG	CAUAGCUUC CAAUAAAG
	1867 CCCAACUU CUGAUGA X GAA AUUGGAAG	CUUCCAAUA AAGUUGGG
	1872 ACAGUCCC CUGAUGA X GAA ACUUUAUU	AAUAAAGUU GGGACUGU
	1893 UAAAAGCU CUGAUGA X GAA AUGUUUCU	AGAAAACAUA AGCUUUUA
30	1898 UGAUUAUA CUGAUGA X GAA AGCUUUAUG	CAUAAGCUU UUUAUCA
	1899 GUGAUUAUA CUGAUGA X GAA AAGCUUAU	AUAAGCUUU UUAUACAC
	1900 UGUGAUAU CUGAUGA X GAA AAAGCUUA	UAAGCUUUU AUAAUCACA
	1901 CUGUGAUUA CUGAUGA X GAA AAAAGCUU	AAGCUUUUA UAUCACAG

	1903	AUCUGUGA CUGAUGA X GAA AUAAAAGC	GCUUUUUAUA UCACAGAU
	1905	ACAUCUGU CUGAUGA X GAA AUAUAAAA	UUUUAUAUC ACAGAUGU
	1925	UAACAUCA CUGAUGA X GAA ACCCAUUU	AAAUGGGUU UCAUGUUA
	1926	UUAACAUCA CUGAUGA X GAA AACCCAUU	AAUGGGUUU CAGUUAA
5	1927	GUUAACAU CUGAUGA X GAA AAACCCAU	AUGGGUUUC AUGUUAAC
	1932	UCCAAGUU CUGAUGA X GAA ACAUGAAA	UUUCAUGUU AACUJGGA
	1933	UJCCAAGU CUGAUGA X GAA AACAUAGAA	UUCAUGUUA ACUJGGAA
	1937	UUUUUUC CUGAUGA X GAA AGUUAACA	UGUUAACUU GGAAAAAA
	1976	CUGUGCAA CUGAUGA X GAA ACAGUUUC	GAAACUGUC UUGCACAG
10	1978	AACUGUGC CUGAUGA X GAA AGACAGUU	AACUGUCUU GCACAGUU
	1986	AACUUGUU CUGAUGA X GAA ACUGUGCA	UGCACAGUU AACAAAGU
	1987	GAACUUGU CUGAUGA X GAA AACUGUGC	GCACAGUUA ACAAGUUC
	1994	UGUUAAG CUGAUGA X GAA ACUUGUUA	UAACAAGUU CUUAUACA
	1995	CUGUAAAA CUGAUGA X GAA AACUUGUU	AACAAGUUC UUAAUACAG
15	1997	CUCUGUAU CUGAUGA X GAA AGAACUUG	CAAGUUCUU AUACAGAG
	1998	UCUCUGUA CUGAUGA X GAA AAGAACUU	AAGUUCUUA UACAGAGA
	2000	CGUCUCUG CUGAUGA X GAA AUAAGAAC	GUUCUJUA CAGAGACG
	2010	AUCCAAGU CUGAUGA X GAA ACGUCUCU	AGAGACGUU ACUJGGAU
	2011	AAUCCAAG CUGAUGA X GAA AACGUCUC	GAGACGUUA CUUGGAUU
20	2014	UAAAAAUCC CUGAUGA X GAA AGUAACGU	ACGUUACUU GGAAUAAA
	2019	CGCAGUAA CUGAUGA X GAA AUCCAAGU	ACUJGGAUU UUACUGCG
	2020	CCGCAGUA CUGAUGA X GAA AAUCCAAG	CUUGGAUUU UACUGCGG
	2021	UCCGCAGU CUGAUGA X GAA AAAUCCAA	UUGGAUUUU ACUGCGGA
	2022	GUCCGCAG CUGAUGA X GAA AAAAUCCA	UGGAUJUUUA CUGCGGAC
25	2034	CUGUUAUU CUGAUGA X GAA ACUGUCCG	CGGACAGUU AAUAACAG
	2035	UCUGUUAU CUGAUGA X GAA AACUGUCC	GGACAGUUA AUAAACAGA
	2038	UGUUCUGU CUGAUGA X GAA AUUAACUG	CAGUUAAUA ACAGAACAA
	2054	UAAUACUG CUGAUGA X GAA AGUGCAUU	AAUGCACUA CAGUAAUA
	2059	CUUGCUAL CUGAUGA X GAA ACUGUAGU	ACUACAGUA UUAGCAAG
30	2061	UGCUUGCU CUGAUGA X GAA AUACUGUA	UACAGUAUU AGCAAGCA
	2062	UUGCUUGC CUGAUGA X GAA AAUACUGU	ACAGUAAUA GCAAGCAA
	2082	UCCUUAGU CUGAUGA X GAA AUGGCCAU	AUGGCCAUC ACUAAGGA
	2086	GUGCUCCU CUGAUGA X GAA AGUGAUGG	CCAUCACUA AGGAGCAC

	2096	GAGUGAUG CUGAUGA X GAA AGUGCUC	GGAGCACUC CAUCACUC
	2100	UUAAGAGU CUGAUGA X GAA AUGGAGUG	CACUCCAUC ACUCUUAA
	2104	AAGAUUAA CUGAUGA X GAA AGUGAUGG	CCAUCACUC UUAAUCUU
	2106	GUAAGAUU CUGAUGA X GAA AGAGUGAU	AUCACUCUU AAUCUUAC
5	2107	GGUAAGAU CUGAUGA X GAA AAGAGUGA	UCACUCUU AUCUUACC
	2110	GAUGGUAA CUGAUGA X GAA AUUAAGAG	CUCUAAAUC UUACCAUC
	2112	AUGAUGGU CUGAUGA X GAA AGAUUAAG	CUUAAUCUU ACCAUCAU
	2113	CAUGAUGG CUGAUGA X GAA AAGAUUAA	UUAAUCUUA CCAUCAUG
	2118	ACAUUCAU CUGAUGA X GAA AUGGUAAG	CUUACCAUC AUGAAUGU
10	2127	UGCAGGG A CUGAUGA X GAA ACAUUCAU	AUGAAUGUU UCCCUGCA
	2128	UUGCAGGG CUGAUGA X GAA AACAUUCA	UGAAUGUUU CCCUGCAA
	2129	CUUGCAGG CUGAUGA X GAA AAACAUUC	GAAUGUUUC CCUGCAAG
	2140	GGUGCCUG CUGAUGA X GAA AUCUUGCA	UGCAAGAUU CAGGCACC
	2141	AGGUGCCU CUGAUGA X GAA AAUCUUGC	GCAAGAUUC AGGCACCU
15	2150	UGCAGGCCA CUGAUGA X GAA AGGUGCCU	AGGCACCUA UGCCUGCA
	2172	CCUGUGUA CUGAUGA X GAA ACAUUCU	AGGAAUGUA UACACAGG
	2174	CCCCUGUG CUGAUGA X GAA AUACAUUC	GAAUGUUA CACAGGGG
	2190	UUCUGGAG CUGAUGA X GAA AUUUCUUC	GAAGAAAUC CUCCAGAA
	2193	UUCUUCUG CUGAUGA X GAA AGGAUUUC	GAAAUCUC CAGAAGAA
20	2208	CUGAUUGU CUGAUGA X GAA AUUUCUUJ	AAAGAAAUU ACAAUCAG
	2209	UCUGAUUG CUGAUGA X GAA AAUUCUU	AAGAAAUA CAAUCAGA
	2214	UGAUCUCU CUGAUGA X GAA AUUGUAAU	AUUACAAUC AGAGAUCA
	2221	UGCUUCCU CUGAUGA X GAA AUCUCUGA	UCAGAGAUC AGGAAGCA
	2234	GCAGGGAGG CUGAUGA X GAA AUGGUGCU	AGCACCAUA CCUCCUGC
25	2238	UUUCGCAG CUGAUGA X GAA AGGUAUHG	CCAUACCUC CUGCGAAA
	2250	UGAUCACU CUGAUGA X GAA AGGUUUCG	CGAAACCUC AGUGAUCA
	2257	CACUGUGU CUGAUGA X GAA AUCACUGA	UCAGUGAUC ACACAGUG
	2271	GAACUGCU CUGAUGA X GAA AUGGCCAC	GUGGCCAUC AGCAGUUC
	2278	AGUGGUGG CUGAUGA X GAA ACUGCUGA	UCAGCAGUU CCACCACU
30	2279	AAGUGGUG CUGAUGA X GAA AACUGCUG	CAGCAGUUC CACCACUU
	2287	ACAGUCUA CUGAUGA X GAA AGUGGUGG	CCACCAUU UAGACUGU
	2288	GACAGUCU CUGAUGA X GAA AAGUGGUG	CACCAUUU AGACUGUC
	2289	UGACAGUC CUGAUGA X GAA AAAGUGGU	ACCACUUUA GACUGUCA

	2296	AUUAGCAU CUGAUGA X GAA ACAGUCUA	UAGACUGUC AUGCUAAU
	2302	GACACCAU CUGAUGA X GAA AGCAUGAC	GUCAUGCUA AUGGUGUC
	2310	GGCUCGGG CUGAUGA X GAA ACACCAUU	AAUGGUGUC CCCGAGCC
	2320	AGUGAUCU CUGAUGA X GAA AGGCUCGG	CCGAGCCUC AGAUCACU
5	2325	AACCAAGU CUGAUGA X GAA AUCUGAGG	CCUCAGAUC ACUUGGUU
	2329	UUUAAAACC CUGAUGA X GAA AGUGAUCU	AGAUCACUU GGUUUAAA
	2333	UGUUUUUA CUGAUGA X GAA ACCAAGUG	CACUUGGUU UAAAAACA
	2334	UUGUUUUU CUGAUGA X GAA AACCAAGU	ACUUGGUUU AAAAACAA
	2335	GUUGUUUU CUGAUGA X GAA AAACCAAG	CUUGGUUUA AAAACAAC
10	2352	UCUUGUUG CUGAUGA X GAA AUUUJUG	CACAAAAUA CAACAAGA
	2370	CCUAAAAAU CUGAUGA X GAA AUUCCAGG	CCUGGAAUU AUUUUAGG
	2371	UCCUAAAA CUGAUGA X GAA AAUCCAG	CUGGAAUUA UUUUAGGA
	2373	GGUCCUAA CUGAUGA X GAA AUAUUC	GGAAUJAUU UUAGGACC
	2374	UGGUCCUA CUGAUGA X GAA AAUAAUUC	GAAUUAUUU UAGGACCA
15	2375	CUGGUCCU CUGAUGA X GAA AAAUAAU	AAUUAUUUU AGGACCAAG
	2376	CCUGGUCC CUGAUGA X GAA AAAUAAAU	AUUAUUUA GGACCAGG
	2399	UUUCAAUA CUGAUGA X GAA ACAGCGUG	CACGCUGUU UAUJGAAA
	2400	CUUUCAAU CUGAUGA X GAA AACAGCGU	ACCGCUGUUU AUUGAAAG
	2401	UCUUUCAA CUGAUGA X GAA AAACAGCG	CGCUGUUJA UUGAAAGA
20	2403	ACUCUUUC CUGAUGA X GAA AUAAACAG	CUGUUUAUU GAAAGAGU
	2412	UCUUCUGU CUGAUGA X GAA ACUCUUUC	GAAAGAGUC ACAGAAGA
	2433	CAGUGUA CUGAUGA X GAA ACACCUUC	GAAGGUGUC UAUCACUG
	2435	UGCAGUGA CUGAUGA X GAA AGACACCU	AGGUGUCUA UCACUGCA
	2437	UUUGCAGU CUGAUGA X GAA AUAGACAC	GUGUCUAUC ACUGCAAA
25	2465	UUUCCACA CUGAUGA X GAA AGCCCUC	GAAGGGCUC UGUGGAAA
	2476	GUAUGCUG CUGAUGA X GAA ACUUUCCA	UGGAAAGUU CAGCAUAC
	2477	GGUAUGCU CUGAUGA X GAA AACUUUCC	GGAAAGUUC AGCAUACC
	2483	CAGUGAGG CUGAUGA X GAA AUGCUGAA	UUCAGCAUA CCUCACUG
	2487	UGAACAGU CUGAUGA X GAA AGGUAU	GCAUACCUC ACUGUUCA
30	2493	GUUCCUUG CUGAUGA X GAA ACAGUGAG	CUCACUGUU CAAGGAAC
	2494	GGUUCCUU CUGAUGA X GAA AACAGUGA	UCACUGUUC AAGGAACC
	2504	ACUUGUCC CUGAUGA X GAA AGGUUCCU	AGGAACCUC GGACAAGU
	2513	CCAGAUUA CUGAUGA X GAA ACUUGUCC	GGACAAGUC UAAUCUGG

	2515	CUCCAGAU CUGAUGA X GAA AGACUUGU	ACAAGUCUA AUCUGGAG
	2518	CAGCUCCA CUGAUGA X GAA AUUAGACU	AGUCUAAUC UGGAGCUG
	2529	GUUAGAGU CUGAUGA X GAA AUCAGCUC	GAGCUGAUC ACUCUAAC
	2533	GCAUGUUA CUGAUGA X GAA AGUGAUCA	UGAUCACUC UAACAUHG
5	2535	GUGCAUGU CUGAUGA X GAA AGAGUGAU	AUCACUCUA ACAUGCAC
	2560	CCAGAAGA CUGAUGA X GAA AGUCGCAG	CUGCGACUC UCUUCUGG
	2562	AGCCAGAA CUGAUGA X GAA AGAGUCGC	GCGACUCUC UUCUGGCU
	2564	GGAGCCAG CUGAUGA X GAA AGAGAGUC	GACUCUCUU CUGGCUCC
	2565	AGGAGCCA CUGAUGA X GAA AACAGAGU	ACUCUCUUC UGGCUCCU
10	2571	GUUAAUAG CUGAUGA X GAA AGCCAGAA	UUCUGGCUC CUAUUAAC
	2574	AGGGUAAA CUGAUGA X GAA AGGAGCCA	UGGCUCCUA UUAACCCU
	2576	GGAGGGUU CUGAUGA X GAA AUAGGAGC	GCUCCUAAU AACCCUCC
	2577	AGGAGGGU CUGAUGA X GAA AAUAGGAG	CUCCUAAUJA ACCCUCCU
	2583	CGGAUAAG CUGAUGA X GAA AGGGUAAA	UUAACCCUC CUUAUCCG
15	2586	UUUCGGAU CUGAUGA X GAA AGGAGGGU	ACCCUCCUU AUCCGAAA
	2587	UUUUCGGA CUGAUGA X GAA AAGGAGGG	CCCUCCUUA UCCGAAAA
	2589	AUUUUUCG CUGAUGA X GAA AUAGGAG	CUCCUUAUC CGAAAAAU
	2606	CAGAAGAA CUGAUGA X GAA ACCUUUUC	GAAAAGGUC UUCUUCUG
	2608	UUCAGAAG CUGAUGA X GAA AGACCUU	AAAGGUCUU CUUCUGAA
20	2609	UUUCAGAA CUGAUGA X GAA AAGACCUU	AAGGUCUUC UUCUGAAA
	2611	UAUUUCAG CUGAUGA X GAA AGAAGACC	GGUCUUCUU CUGAAAUA
	2612	UUAAUUCA CUGAUGA X GAA AAGAAGAC	GUCUUCUUC UGAAAUA
	2619	UCAGUCUU CUGAUGA X GAA AUJUCAGA	UCUGAAAUA AAGACUGA
	2630	UUGAUAGG CUGAUGA X GAA AGUCAGUC	GACUGACUA CCUAUCAA
25	2634	AUAAUUGA CUGAUGA X GAA AGGUAGUC	GACUACCUA UCAAUUAU
	2636	UUUAUAAA CUGAUGA X GAA AUAGGUAG	CUACCUAUC AAUUAUAA
	2640	UCCAUUAA CUGAUGA X GAA AUUGAUAG	CUAUCAAUU AUAAUGGA
	2641	GUCCAUUA CUGAUGA X GAA AAUUGAU	UAUCAAUUA UAAUGGAC
	2643	GGGUCCAU CUGAUGA X GAA AUAAUUGA	UCAAUUAUA AUGGACCC
30	2661	UCCAAAGG CUGAUGA X GAA ACUUCAUC	GAUGAAGUU CCUUJUGGA
	2662	AUCCAAAG CUGAUGA X GAA AACUUCAU	AUGAAGUUC CUUUGGAU
	2665	CUCAUCCA CUGAUGA X GAA AGGAACU	AAGUUCCUU UGGAUGAG
	2666	GCUCAUCC CUGAUGA X GAA AAGGAACU	AGUUCCUUU GGAUGAGC

	2688	UCAUAAGG CUGAUGA X GAA AGCCGCUC	GAGCGGCUC CCUUAUGA
	2692	GGCAUCAU CUGAUGA X GAA AGGGAGCC	GGCUCCCCUU AUGAUGCC
	2693	UGGCAUCA CUGAUGA X GAA AAGGGAGC	GCUCCCUUA UGAUGCCA
	2714	CCCGGGCA CUGAUGA X GAA ACUCCAC	GUGGGAGUU UGCCCGGG
5	2715	UCCCAGGC CUGAUGA X GAA AACUCCA	UGGGAGUUU GCCCGGGA
	2730	CCCAGUUU CUGAUGA X GAA AGUCUCUC	GAGAGACUU AAACUGGG
	2731	GCCCAGUU CUGAUGA X GAA AAGUCUCU	AGAGACUUU AACUGGGC
	2744	UUCCAAGU CUGAUGA X GAA AUUJGCC	GGGCAAAUC ACUUGGAA
	2748	CCUCUUCC CUGAUGA X GAA AGUGAUUU	AAAUCACUU GGAAGAGG
10	2761	UUUUUCAA CUGAUGA X GAA AGCCCCUC	GAGGGGCUU UUGGAAAA
	2762	CUUUUCCA CUGAUGA X GAA AAGCCCCU	AGGGGCUUU UGGAAAAG
	2763	ACUUUUUCC CUGAUGA X GAA AAAGCCCC	GGGGCUUUU GGAAAAGU
	2775	GAUGCUUG CUGAUGA X GAA ACCACUUU	AAAGUGGUU CAAGCAUC
	2776	UGAUGCUU CUGAUGA X GAA AACCAUU	AAGUGGUUC AAGCAUCA
15	2783	CAAAUGCU CUGAUGA X GAA AUGCUUGA	UCAAGCAUC AGCAUUJG
	2789	UAAUGCCA CUGAUGA X GAA AUGCUGAU	AUCAGCAUU UGGCAUUA
	2790	UUAAUGCC CUGAUGA X GAA AAUGCUGA	UCAGCAUUU GGCAUUA
	2796	GAUUUCUU CUGAUGA X GAA AUGCCAA	UUUGGCAUU AAGAAAUC
	2797	UGAUUUCU CUGAUGA X GAA AAUGCCAA	UUGGCAUUA AGAAAUC
20	2804	ACGUAGGU CUGAUGA X GAA AUUUCUUA	UAAGAAAUC ACCUACGU
	2809	CCGGCACG CUGAUGA X GAA AGGUGAUU	AAUCACCUA CGUGCCGG
	2864	GAGCUUUG CUGAUGA X GAA ACUCGCUG	CAGCGAGUA CAAAGCUC
	2872	AGUCAUCA CUGAUGA X GAA AGCUUJGU	ACAAAGCUC UGAUGACU
	2886	AAGAUUUU CUGAUGA X GAA AGCUCAGU	ACUGAGCUA AAAACUU
25	2892	UGGGUCAA CUGAUGA X GAA AUUUUUAG	CUAAAAAAUC UUGACCCA
	2894	UGUGGGUC CUGAUGA X GAA AGAUUUUU	AAAAAACUUU GACCCACA
	2904	UGGUGGCC CUGAUGA X GAA AUGUGGGU	ACCCACAUU GGCCACCA
	2914	CACGUUCA CUGAUGA X GAA AUGGUGGC	GCCACCAUC UGAACGUG
	2925	AGCAGGUU CUGAUGA X GAA ACCACGUU	AACGUGGUU AACCUGCU
30	2926	CAGCAGGU CUGAUGA X GAA AACACGU	ACGUGGUUA ACCUGCUG
	2962	CACCAUCA CUGAUGA X GAA AGGCCUC	GAGGGCCUC UGAUGGUG
	2973	UAUUCAAC CUGAUGA X GAA AUCACCAU	AUGGUGAUU GUUGAAUA
	2976	CAGUAUUC CUGAUGA X GAA ACAACAC	GUGAUUGUU GAAUACUG

	2981	AUUUGCAG CUGAUGA X GAA AUUCAACA	UGUUGAAUA CUGCAAAU
	2990	GAUUUCCA CUGAUGA X GAA AUUUGCAG	CUGCAAAUA UGGAAAUC
	2998	GUUGGAGA CUGAUGA X GAA AUUCCAU	AUGGAAAUC UCUCCAAC
	3000	UAGUUGGA CUGAUGA X GAA AGAUUUCC	GGAAAUCUC UCCAACUA
5	3002	GGUAGUUG CUGAUGA X GAA AGAGAUUU	AAAUCUCUC CAACUACC
	3008	UCUUGAGG CUGAUGA X GAA AGUUGGAG	CUCCAACUA CCUCAAGA
	3012	UUGCUCUU CUGAUGA X GAA AGGUAGUU	AACUACCUC AAGAGCAA
	3029	GAAAAAAU CUGAUGA X GAA AGUCACGU	ACGUGACUU AUUUUUUC
	3030	AGAAAAAA CUGAUGA X GAA AAGUCACG	CGUGACUUA UUUUUUCU
10	3032	UGAGAAAA CUGAUGA X GAA AUAAGUCA	UGACUUUU UUUUCUCA
	3033	UUGAGAAA CUGAUGA X GAA AAUAAGUC	GACUUUUU UUUUCUAA
	3034	GUJUGAGAA CUGAUGA X GAA AAAUAAGU	ACUUUUUU UUCUCAAC
	3035	UGUUGAGA CUGAUGA X GAA AAAUAAG	CUUAUUUU UCUCACAA
	3036	UUGUUGAG CUGAUGA X GAA AAAUAUA	UUAUUUUU CUCAACAA
15	3037	CUUGUUGA CUGAUGA X GAA AAAAAAUA	UAUUUUUC UCAACAAG
	3039	UCCUUGUU CUGAUGA X GAA AGAAAAAA	UUUUUUCUC ACAAGGAA
	3057	UCCAUGUG CUGAUGA X GAA AGUGCUGC	GCAGCACUA CACAUGGA
	3070	UUCUUUCU CUGAUGA X GAA AGGCUCCA	UGGAGCCUA AGAAAGAA
	3120	ACGCUAUC CUGAUGA X GAA AGUCUUGG	CCAAGACUA GAUAGCGU
20	3124	GGUGACGC CUGAUGA X GAA AUCUAGUC	GACUAGAU A GCGUCACC
	3129	CUGCUGGU CUGAUGA X GAA ACGCUAUC	GAUAGCGUC ACCAGCAG
	3146	AGCUCGCA CUGAUGA X GAA AGCUUUCG	CGAAAGCUU UGCGAGCU
	3147	GAGCUCGC CUGAUGA X GAA AAGCUUUC	GAAAGCUU GCGAGCUC
	3155	GAAAGCCG CUGAUGA X GAA AGCUCGCA	UGCGAGCUC CGGUUUC
25	3161	CUUCCUGA CUGAUGA X GAA AGCCGGAG	CUCCGGCUU UCAGGAAG
	3162	UCUUCCUG CUGAUGA X GAA AAGCCGG	UCCGGCUUU CAGGAAGA
	3163	AUCUUCCU CUGAUGA X GAA AAAGCCGG	CCGGCUUUC AGGAAGAU
	3172	CAGACUUU CUGAUGA X GAA AUCUUCCU	AGGAAGAU AAAGUCUG
	3178	AUCACUCA CUGAUGA X GAA ACUUUUAU	AUAAAAGUC UGAGUGAU
30	3189	UCUUCCUC CUGAUGA X GAA ACAUCACU	AGUGAUGUU GAGGAAGA
	3205	ACCGUCAG CUGAUGA X GAA AUCCUCCU	AGGAGGAUU CUGACGGU
	3206	AACCGUCA CUGAUGA X GAA AAUCCUCC	GGAGGAUUC UGACGGUU
	3214	CUUGUAGA CUGAUGA X GAA ACCGUCAG	CUGACGGUU UCUACAAG

	3215	CCUUGUAG CUGAUGA X GAA AACCGUCA	UGACGGUUU CUACAAGG
	3216	UCCUUGUA CUGAUGA X GAA AAACCGUC	GACGGUUUC UACAAGGA
	3218	GCUCCUUG CUGAUGA X GAA AGAAACCG	CGGUUJCUA CAAGGAGC
	3231	UCCAUAGU CUGAUGA X GAA AUGGGCUC	GAGCCAUC ACUAUGGA
5	3235	AUCUUCCA CUGAUGA X GAA AGUGAUGG	CCAUCACUA UGGAAGAU
	3244	AGAAAUC A CUGAUGA X GAA AUCUUCCA	UGGAAGAUC UGAUUUCU
	3249	CUGUAAGA CUGAUGA X GAA AUCAGAUC	GAUCUGAUU UCUUACAG
	3250	ACUGUAAG CUGAUGA X GAA AAUCAGAU	AUCUGAUUU CUUACAGU
	3251	AACUGUAA CUGAUGA X GAA AAAUCAGA	UCUGAUUUC UUACAGUU
10	3253	AAAACUGU CUGAUGA X GAA AGAAAUC	UGAUUUJCUU ACAGUUUU
	3254	GAAAACUG CUGAUGA X GAA AAGAAAUC	GAUUUCUUA CAGUUUUC
	3259	CACUUGAA CUGAUGA X GAA ACUGUAAG	CUUACAGUU UUCAAGUG
	3260	CCACUUGA CUGAUGA X GAA AACUGUAA	UUACAGUUU UCAAGUGG
	3261	GCCACUUG CUGAUGA X GAA AAACUGUA	UACAGUUUU CAAGUGGC
15	3262	GGCACUU CUGAUGA X GAA AAAACUGU	ACAGUUUUC AAGUGGCC
	3284	AAGACAGG CUGAUGA X GAA ACUCCAUG	CAUGGAGUU CCUGUCUU
	3285	GAAGACAG CUGAUGA X GAA AACUCCAU	AUGGAGUUC CUGUCUUC
	3290	UUCUGGAA CUGAUGA X GAA ACAGGAAC	GUUCCUGUC UUCCAGAA
	3292	CUUUCUGG CUGAUGA X GAA AGACAGGA	UCCUGUCUU CCAGAAAG
20	3293	ACUUUCUG CUGAUGA X GAA AAGACAGG	CCUGUCUUC CAGAAAGU
	3306	UCCCGAUG CUGAUGA X GAA AUGCACUU	AAGUGCAUU CAUCGGGA
	3307	GUCCCGAU CUGAUGA X GAA AAUGCACU	AGUGCAUUC AUCGGGAC
	3310	CAGGUCCC CUGAUGA X GAA AUGAAUGC	GCAUJCAUC GGGACCUG
	3333	GAUAAAAG CUGAUGA X GAA AUGUUUCU	AGAAAACAUU CUUUUAUC
25	3334	AGAUAAAA CUGAUGA X GAA AAUGUUUC	GAAACAUUC UUUUAUCU
	3336	UCAGAUAA CUGAUGA X GAA AGAAUGUU	AACAUUCUU UUAUCUGA
	3337	CUCAGAUA CUGAUGA X GAA AAGAAUGU	ACAUUCUUU UAUCUGAG
	3338	UCUCAGAU CUGAUGA X GAA AAAGAAUG	CAUUCUUUU AUCUGAGA
	3339	UUCUCAGA CUGAUGA X GAA AAAAGAAU	AUUCUUUU UCUGAGAA
30	3341	UGUJUCUCA CUGAUGA X GAA AUAAAAGA	UCUUUUUAUC UGAGAAC
	3363	AAAUCACA CUGAUGA X GAA AUCUUCAC	GUGAAGAUU UGUGAUUU
	3364	AAAUCAC CUGAUGA X GAA AAUCUUCA	UGAAGAUU GUGAUUUU
	3370	AAGGCCAA CUGAUGA X GAA AUCACAAA	UUJUGUGAUU UUGGCCUU

	3371	CAAGGCCA CUGAUGA X GAA AAUCACAA	UUGUGAUUU UGGCCUUG
	3372	GCAAGGCC CUGAUGA X GAA AAAUCACA	UGUGAUUUU GGCCUUGC
	3378	UCCCGGGC CUGAUGA X GAA AGGCCAAA	UUUGGCCUU GCCCGGGAA
	3388	CUUAUAAA CUGAUGA X GAA AUCCCGGG	CCCGGGAUUA UUUUAUAG
5	3390	UUCUUUAU CUGAUGA X GAA AUAUCCCG	CGGGAUAUU UAUAAAGAA
	3391	GUUCUUAU CUGAUGA X GAA AAAAUCCC	GGGAUAUUU AUAGAAC
	3392	GGUUCUUA CUGAUGA X GAA AAAAUUCC	GGAUUUUA UAAGAACCC
	3394	GGGUUUCU CUGAUGA X GAA AUAAAUAU	AUAUUUAUA AGAACCCC
	3406	UCUCACAU CUGAUGA X GAA AUCGGGGU	ACCCCGAUU AUGUGAGA
10	3407	UUCUCACA CUGAUGA X GAA AAUCGGGG	CCCCGAUUA UGUGAGAA
	3424	AAGUCGAG CUGAUGA X GAA AUCUCCUU	AAGGAGAU AUCGACUU
	3427	AGGAAGUC CUGAUGA X GAA AGUAUCUC	GAGAUACUC GACUUCCU
	3432	UUCAGAGG CUGAUGA X GAA AGUCGAGU	ACUCGACUU CCUCUGAA
	3433	UUUCAGAG CUGAUGA X GAA AAGUCGAG	CUCGACUUC CUCUGAAA
15	3436	CCAUUUCA CUGAUGA X GAA AGGAAGUC	GACUUCCUC UGAAAUGG
	3451	AGAUUCGG CUGAUGA X GAA AGCCAUC	GGAUUCCUC CCGAAUCU
	3458	CAAAGAU A CUGAUGA X GAA AUUCGGGA	UCCCGAAUC UAUCUUJUG
	3460	GUCAAAGA CUGAUGA X GAA AGAUUCGG	CCGAAUCUA UCUUUGAC
	3462	UUGUCAAA CUGAUGA X GAA AUAGAUUC	GAAUCUAUC UUUGACAA
20	3464	UUUUGUCA CUGAUGA X GAA AGAUAGAU	AUCUAUCUU UGACAAAAA
	3465	AUUUUGUC CUGAUGA X GAA AAGAUAGA	UCUAUCUUU GACAAAAAU
	3474	GUGCUGUA CUGAUGA X GAA AUUUUGUC	GACAAAUC UACAGCAC
	3476	UGGUGCUG CUGAUGA X GAA AGAUUUJUG	CAAAUCUA CAGCACCA
	3500	CUCCGUAA CUGAUGA X GAA ACCACACG	CGUGUGGUC UUACGGAG
25	3502	UACUCCGU CUGAUGA X GAA AGACCACA	UGUGGUCUU ACGGAGUA
	3503	AUACUCCG CUGAUGA X GAA AAGACCAC	GUGGUCUUA CGGAGUAU
	3510	CACAGCAA CUGAUGA X GAA ACUCCGUA	UACGGAGUA UUGCUGUG
	3512	CCCACAGC CUGAUGA X GAA AUACUCCG	CGGAGUAUU GCUGUGGG
	3525	AAGGAGAA CUGAUGA X GAA AUUUCCCA	UGGGAAAUC UUCUCCUU
30	3527	CUAAGGAG CUGAUGA X GAA AGAUUUC	GGAAAUCUU CUCCUUAG
	3528	CCUAAGGA CUGAUGA X GAA AAGAUUUC	GAAAUCUUC UCCUUAGG
	3530	CACCUAAG CUGAUGA X GAA AGAAGAUU	AAUCUUCUC CUUAGGUG
	3533	ACCCACCU CUGAUGA X GAA AGGAGAAG	CUUCUCCUU AGGUGGGU

	3534	GACCCACC CUGAUGA X GAA AAGGAGAA	UUCUCCUUA GGUGGGUC
	3542	GGUAUGGA CUGAUGA X GAA ACCCACCU	AGGUGGGUC UCCAUACC
	3544	UGGGUAUG CUGAUGA X GAA AGACCCAC	GUGGGUCUC CAUACCCA
	3548	CUCCUGGG CUGAUGA X GAA AUGGAGAC	GUCUCCAUA CCCAGGAG
5	3558	UCCAUUUG CUGAUGA X GAA ACUCCUGG	CCAGGAGUA CAAAUGGA
	3575	GACUGCAA CUGAUGA X GAA AGUCCUCA	UGAGGACUU UUGCAGUC
	3576	CGACUGCA CUGAUGA X GAA AAGUCCUC	GAGGACUUU UGCAGUCG
	3577	GCGACUGC CUGAUGA X GAA AAAGUCCU	AGGACUUU GCAGUCGC
	3583	CCUCAGGC CUGAUGA X GAA ACUGCAAA	UUUGCAGUC GCCUGAGG
10	3613	GUACUCAG CUGAUGA X GAA AGCUCUCA	UGAGAGCUC CUGAGUAC
	3620	GAGUAGAG CUGAUGA X GAA ACUCAGGA	UCCUGAGUA CUCUACUC
	3623	CAGGAGUA CUGAUGA X GAA AGUACUCA	UGAGUACUC UACUCCUG
	3625	UUCAGGAG CUGAUGA X GAA AGAGUACU	AGUACUCUA CUCCUGAA
	3628	GAUUUCAG CUGAUGA X GAA AGUAGAGU	ACUCUACUC CUGAAAUC
15	3636	AUCUGAUA CUGAUGA X GAA AUUUCAGG	CCUGAAAUC UAUCAGAU
	3638	UGAUCUGA CUGAUGA X GAA AGAUUUCA	UGAAAUCUA UCAGAUCA
	3640	CAUGAUCU CUGAUGA X GAA AUAGAUUU	AAAUCUAUC AGAUCAUG
	3645	UCCAGCAU CUGAUGA X GAA AUCUGAUA	UAUCAGAUC AUGCUGGA
	3689	GUUCUGCA CUGAUGA X GAA AUCUUGGC	GCCAAGAUU UGCAGAAC
20	3690	AGUUCUGC CUGAUGA X GAA AAUCUUGG	CCAAGAUU GCAGAACU
	3699	UUUUCAC CUGAUGA X GAA AGUUCUGC	GCAGAACUU GUGGAAAA
	3711	AAAUCACC CUGAUGA X GAA AGUUUUUC	GAAAAACUA GGUGAUUU
	3718	UUGAAGCA CUGAUGA X GAA AUCACCUA	UAGGUGAUU UGCUUCAA
	3719	CUUGAAGC CUGAUGA X GAA AAUCACCU	AGGUGAUUU GCUUCAAG
25	3723	UUUGCUG CUGAUGA X GAA AGCAAAUC	GAUUUGCUU CAAGCAAA
	3724	AUUUGCUU CUGAUGA X GAA AAGCAAAU	AUUUGCUC AAGCAAAU
	3735	UCCUGUUG CUGAUGA X GAA ACAUUUGC	GCAAAGUA CAACAGGA
	3748	GUAGUCUU CUGAUGA X GAA ACCAUCCU	AGGAUGGUA AAGACUAC
	3755	UUGGGAUG CUGAUGA X GAA AGUCUUUA	UAAAGACUA CAUCCCAA
30	3759	UUGAUUUG CUGAUGA X GAA AUGUAGUC	GACUACAUC CCAAUCAA
	3765	AUGGCCAU CUGAUGA X GAA AUJUGGGAU	AUCCCAAUC AAUGCCAU
	3774	CCUGUCAG CUGAUGA X GAA AUGGCAUU	AAUGCCAU A CUGACAGG
	3787	AAACCCAC CUGAUGA X GAA AUUUCUG	CAGGAAAUA GUGGGUUU

3794	AGUAUGUA CUGAUGA X GAA ACCCACUA	UAGUGGGUU UACAUACU
3795	GAGUAUGU CUGAUGA X GAA AACCCACU	AGUGGGUUU ACAUACUC
3796	UGAGUAUG CUGAUGA X GAA AAACCCAC	GUGGGUUUA CAUACUCA
3800	GAGUUGAG CUGAUGA X GAA AUGUAAAC	GUUUACAUUA CUCAACUC
5	3803 CAGGAGUU CUGAUGA X GAA AGUAUGUA	UACAUACUC AACUCCUG
3808	GAAGGCAG CUGAUGA X GAA AGUJUGAGU	ACUCAACUC CUGCCUUC
3815	CCUCAGAG CUGAUGA X GAA AGGCAGGA	UCCUGCCUU CUCUGAGG
3816	UCCUCAGA CUGAUGA X GAA AAGGCAGG	CCUGCCUUC UCUGAGGA
3818	AGUCCUCA CUGAUGA X GAA AGAAGGCA	UGCCUUCUC UGAGGACU
10	3827 CCUUGAAG CUGAUGA X GAA AGUCCUCA	UGAGGACUU CUUCAAGG
3828	UCCUUGAA CUGAUGA X GAA AAGUCCUC	GAGGACUUC UUCAAGGA
3830	UUUCCUUG CUGAUGA X GAA AGAAGUCC	GGACUUCUU CAAGGAAA
3831	CUUCCUU CUGAUGA X GAA AAGAAGUC	GACUUCUUC AAGGAAAG
3841	AGCUGAAA CUGAUGA X GAA ACUUUCCU	AGGAAAGUA UUUCAGCU
15	3843 GGAGCUGA CUGAUGA X GAA AUACUUUC	GAAAGUAUU UCAGCUCC
3844	CGGAGCUG CUGAUGA X GAA AAUACUUU	AAAGUAUUU CAGCUCCG
3845	UCGGAGCU CUGAUGA X GAA AAAUACUU	AAGUAUUUC AGCUCCGA
3850	AAACUUCG CUGAUGA X GAA AGCUGAAA	UUUCAGCUC CGAAGUUU
3857	CUGAAUJA CUGAUGA X GAA ACUUCGGA	UCCGAAGUU UAAUUCAG
20	3858 CCUGAAUU CUGAUGA X GAA AACUUCGG	CCGAAGUUU AAUUCAGG
3859	UCCUGAAU CUGAUGA X GAA AAACUUCG	CGAAGUUUA AUUCAGGA
3862	GCUUCCUG CUGAUGA X GAA AUUAAACU	AGUUUAAUU CAGGAAGC
3863	AGCUUCCU CUGAUGA X GAA AAUAAAAC	GUUUAAUUC AGGAAGCU
3872	CAUCAUCA CUGAUGA X GAA AGCUUCCU	AGGAAGCUC UGAUGAUG
25	3882 ACAUAUCU CUGAUGA X GAA ACAUCAUC	GAUGAUGUC AGAU AUGU
3887	CAUUUACA CUGAUGA X GAA AUCUGACA	UGUCAGAUA UGUAAAUG
3891	AAAGCAUU CUGAUGA X GAA ACAUAUCU	AGAU AUGUA AAUGCUUU
3898	GAACUUGA CUGAUGA X GAA AGCAUUUA	UAAAUGCUU UCAAGUUC
3899	UGAACUUG CUGAUGA X GAA AAGCAUUU	AAAUGCUUU CAAGUUCA
30	3900 AUGAACUU CUGAUGA X GAA AAAGCAUU	AAUGCUCUUC AAGUUCAU
3905	GGCUCAUG CUGAUGA X GAA ACUUGAAA	UUUCAAGUU CAUGAGCC
3906	AGGCUCAU CUGAUGA X GAA AACUUGAA	UUCAAGUUC AUGAGCCU
3924	AAGGUUUU CUGAUGA X GAA AUUCUUUC	GAAAGAAUC AAAACCUU

3932	GUUCUUCA CUGAUGA X GAA AGGUUUUG	CAAAACCUU UGAAGAAC
3933	AGUUCUUC CUGAUGA X GAA AAGGUUUU	AAAACCUU GAAGAACU
3942	UUCGGUAA CUGAUGA X GAA AGUUCUUC	GAAGAACUU UUACCGAA
3943	AUUCGGUA CUGAUGA X GAA AAGUUCUU	AAGAACUUU UACCGAAU
5 3944	CAUUCGGU CUGAUGA X GAA AAAGUUCU	AGAACUUU ACCGAAUG
3945	GCAUUCGG CUGAUGA X GAA AAAAGUUC	GAACUUUA CCGAAUGC
3959	CAAACAUG CUGAUGA X GAA AGGUGGCA	UGCCACCUC CAUGUUUG
3965	AGUCAUCA CUGAUGA X GAA ACAUGGAG	CUCCAUGUU UGAUGACU
3966	UAGUCAUC CUGAUGA X GAA AACAUAGGA	UCCAUGUUU GAUGACUA
10 3974	CGCCCUGG CUGAUGA X GAA AGUCAUCA	UGAUGACUA CCAGGGCG
3994	GGCCAACA CUGAUGA X GAA AGUGCUGC	GCAGCACUC UGUUGGCC
3998	GAGAGGCC CUGAUGA X GAA ACAGAGUG	CACUCUGUU GGCCUCUC
4004	GCAUGGGA CUGAUGA X GAA AGGCCAAC	GUUGGCCUC UCCCAUGC
4006	CAGCAUGG CUGAUGA X GAA AGAGGCCA	UGGCCUCUC CCAUGCUG
15 4022	UCCAGGUG CUGAUGA X GAA AGCGCUUC	GAAGCGCUU CACCUGGA
4023	GUCCAGGU CUGAUGA X GAA AAGCGCUU	AAGCGCUUC ACCUGGAC
4052	UCUUGAGC CUGAUGA X GAA AGGCCUUG	CAAGGCCUC GCUCAAGA
4056	UCAAUCUU CUGAUGA X GAA AGCGAGGC	GCCUCGCUC AAGAUUGA
4062	CUCAAGUC CUGAUGA X GAA AUCUUGAG	CUCAAGAUU GACUUGAG
20 4067	UUACUCUC CUGAUGA X GAA AGUCAAUC	GAUUGACUU GAGAGUAA
4074	UUACUGGU CUGAUGA X GAA ACUCUCAA	UUGAGAGUA ACCAGUAA
4081	CUUACUUU CUGAUGA X GAA ACUGGUUA	UAACCAGUA AAAGUAAG
4087	CGACUCCU CUGAUGA X GAA ACUUUUAC	GUAAAAGUA AGGAGUCG
4094	ACAGCCCC CUGAUGA X GAA ACUCCUUA	UAAGGAGUC GGGCUGU
25 4103	UGACAUCA CUGAUGA X GAA ACAGCCCC	GGGGCUGUC UGAUGUCA
4110	GGCCUGCU CUGAUGA X GAA ACAUCAGA	UCUGAUGUC AGCAGGCC
4123	AUGGCAGA CUGAUGA X GAA ACUGGGCC	GGCCCAGUU UCUGCCAU
4124	AAUGGCAG CUGAUGA X GAA AACUGGGC	GCCCAGUUU CUGCCAUU
4125	GAAUGGCA CUGAUGA X GAA AAACUGGG	CCCAGUUUC UGCCAUUC
30 4132	ACAGCUGG CUGAUGA X GAA AUGGCAGA	UCUGCCAUU CCAGCUGU
4133	CACAGCUG CUGAUGA X GAA AAUGGCAG	CUGCCAUUC CAGCUGUG
4149	CCUUCGGU CUGAUGA X GAA ACGUGCCC	GGGCACGUC AGCGAAGG
4169	CGUAGGUG CUGAUGA X GAA ACCUGCGC	GCGCAGGUU CACCUACG

	4170	UCGUAGGU CUGAUGA X GAA AACCUGCG	CGCAGGUUC ACCUACGA
	4175	CGUGGUCG CUGAUGA X GAA AGGUGAAC	GUUCACCUA CGACCACG
	4203	CAGCACGC CUGAUGA X GAA AUUUUCCU	AGGAAAUC GCGUGCUG
	4214	GGGGCGGG CUGAUGA X GAA AGCAGCAC	GUGCUGCUC CCCGCC
5	4229	CCGAGUUG CUGAUGA X GAA AGUCUGGG	CCCAGACUA CAACUCGG
	4235	GGACCACC CUGAUGA X GAA AGUUGUAG	CUACAACUC GGUGGUCC
	4242	GAGUACAG CUGAUGA X GAA ACCACCGA	UCGGUGGUC CUGUACUC
	4247	GGGUGGAG CUGAUGA X GAA ACAGGACC	GGUCCUGUA CUCCACCC
	4250	GUGGGGUG CUGAUGA X GAA AGUACAGG	CCUGUACUC CACCCAC
10	4263	AAACUCUA CUGAUGA X GAA AUGGGUGG	CCACCCAUC UAGAGUUU
	4265	UCAAACUC CUGAUGA X GAA AGAUGGGU	ACCCAUCUA GAGUUUGA
	4270	UCGUGUCA CUGAUGA X GAA ACUCUAGA	UCUAGAGUU UGACACGA
	4271	UUCGUGUC CUGAUGA X GAA AACUCUAG	CUAGAGUUU GACACGAA
	4284	CUAGAAA CUGAUGA X GAA AGGCUUCG	CGAAGCCUU AUUUCUAG
15	4285	UCUAGAAA CUGAUGA X GAA AAGGCUUC	GAAGCCUUA UUUCUAGA
	4287	CUUCUAGA CUGAUGA X GAA AUAAGGCC	AGCCUUAUU UCUAGAAG
	4288	GCUUCUAG CUGAUGA X GAA AAUAAGGC	GCCUUJUUU CUAGAACG
	4289	UGCUUCUA CUGAUGA X GAA AAAUAAGG	CCUUUUUC UAGAAGCA
	4291	UGUGCUUC CUGAUGA X GAA AGAAAUA	UUAUJUCUA GAAGCACA
20	4305	GGUUAUAA CUGAUGA X GAA ACACAU	ACAUGUGUA UUUAUACC
	4307	CGGGUAUA CUGAUGA X GAA AUACACAU	AUGUGUAUU UAUACCC
	4308	GGGGGUAU CUGAUGA X GAA AAUACACA	UGUGUAUU AUACCCC
	4309	UGGGGGUA CUGAUGA X GAA AAAUACAC	GUGUAUUA UACCCCC
	4311	CCUGGGGG CUGAUGA X GAA AUAAAUA	GUAUUUUA CCCCCAGG
25	4325	GCAAAAGC CUGAUGA X GAA AGUUUCCU	AGGAAACUA GCUUUUGC
	4329	ACUGGCAA CUGAUGA X GAA AGCUAGUU	AACUAGCUU UJGCCAGU
	4330	UACUGGCA CUGAUGA X GAA AAGCUAGU	ACUAGCUUU UGCCAGUA
	4331	AUACUGGC CUGAUGA X GAA AAAGCUAG	CUAGCUUUU GCCAGUAU
	4338	AUGCAUAA CUGAUGA X GAA ACUGGCAA	UUGCCAGUA UUAUGCAU
30	4340	AUAUGCAU CUGAUGA X GAA AUACUGGC	GCCAGUAUU AUGCAUAU
	4341	UAAUAGCA CUGAUGA X GAA AAUACUGG	CCAGUAUUA UGCAUUA
	4347	AACUUUA CUGAUGA X GAA AUGCAUAA	UUAUGCAUA UAUAAAGUU
	4349	AAAACUUA CUGAUGA X GAA AUAAUGCAU	AUGCAUUA UAAGUUUA

4351	UGUAAACU CUGAUGA X GAA AUUAUUGC	GCAUAUUA AGUUUACA
4355	AAGGUGUA CUGAUGA X GAA ACUUUAU	AUUAAGUU UACACCUU
4356	AAAGGUGU CUGAUGA X GAA AACUUUAU	UUAAGUUU ACACCUUU
4357	UAAAGGUG CUGAUGA X GAA AAACUUAU	AUAAGUUUA CACCUUUA
5 4363	GAAAGAUA CUGAUGA X GAA AGGUGUAA	UUACACCUU UAUCUUUC
4364	GGAAAGAU CUGAUGA X GAA AAGGUGUA	UACACCUUU AUCUUUCC
4365	UGGAAAGA CUGAUGA X GAA AAAGGUGU	ACACCUUUA UCUUUCCA
4367	CAUGGAAA CUGAUGA X GAA AUAAAGGU	ACCUUUAUC UUUCCAUG
4369	CCCAUGGA CUGAUGA X GAA AGAUAAAAG	CUUUAUCUU UCCAUGGG
10 4370	UCCCAUGG CUGAUGA X GAA AAGAUAAA	UUUAUCUUU CCAUGGGA
4371	CUCCCAUG CUGAUGA X GAA AAAGAUAA	UUAUCUUUC CAUGGGAG
4389	AUCACAAA CUGAUGA X GAA AGCAGCUG	CAGCUGCUU UUUGUGAU
4390	AAUCACAA CUGAUGA X GAA AAGCAGCU	AGCUGCUUU UUGUGAUU
4391	AAAUCACA CUGAUGA X GAA AAAGCAGC	GCUGCUUUU UGUGAUUU
15 4392	AAAAUCAC CUGAUGA X GAA AAAAGCAG	CUGCUUUUU GUGAUUUU
4398	AUUAAAAA CUGAUGA X GAA AUCACAAA	UUUGUGAUU UUUUUAAU
4399	UAUUAAA CUGAUGA X GAA AAUCACAA	UJUGUGAUUU UUUJAAUA
4400	CUAUUAAA CUGAUGA X GAA AAAUCACA	UGUGAUUUU UUUAAUAG
4401	ACUAUAAA CUGAUGA X GAA AAAUCAC	GUGAUUUUU UUAAUAGU
20 4402	CACUAUJA CUGAUGA X GAA AAAAUCA	UGAUUUUUU UAAUAGUG
4403	GCACUAUU CUGAUGA X GAA AAAAAAUC	GAUUUUUUU AAUAGUGC
4404	AGCACUAU CUGAUGA X GAA AAAAAAUAU	AUUUUUUUA AUAGUGCU
4407	AAAAGCAC CUGAUGA X GAA AUUAAAAA	UUUUUAAUA GUGCUUUU
4413	AAAAAAA CUGAUGA X GAA AGCACUAU	AUAGUGCUU UUUUUUUU
25 4414	AAAAAAA CUGAUGA X GAA AAGCACUA	UAGUGCUUU UUUUUUUU
4415	CAAAAAAA CUGAUGA X GAA AAAGCACU	AGUGCUUUU UUUUUUUG
4416	UCAAAAAA CUGAUGA X GAA AAAAGCAC	GUGCUUUUU UUUUUUUGA
4417	GUCAAAAA CUGAUGA X GAA AAAAGCA	UGCUUUUUU UUUUUGAC
4418	AGUCAAAA CUGAUGA X GAA AAAAAGC	GCUUUUUUU UUUUGACU
30 4419	UAGUCAAA CUGAUGA X GAA AAAAAG	CUUUUUUUU UUUGACUA
4420	UUAGUCAA CUGAUGA X GAA AAAAAGAA	UJJUUUUUUU UUGACUAA
4421	GUUAGUCA CUGAUGA X GAA AAAAAGAA	UUUUUUUUU UGACUAAC
4422	UGUUAGUC CUGAUGA X GAA AAAAAGAA	UUUUUUUUU GACUAACA

	4427	AUUCUUGU CUGAUGA X GAA AGUCAAAA	UUUJGACUA ACAAGAAU
	4438	UCUGGAGU CUGAUGA X GAA ACAUUCUU	AAGAAUGUA ACUCCAGA
	4442	UCUAUCUG CUGAUGA X GAA AGUUACAU	AUGUAACUC CAGAUAGA
	4448	UAUUUCUC CUGAUGA X GAA AUCUGGAG	CUCCAGAUUA GAGAAAUA
5	4456	CUUGUCAC CUGAUGA X GAA AUUUCUCU	AGAGAAAUA GUGACAAG
	4476	UUUAGCAG CUGAUGA X GAA AGUGUUCU	AGAACACUA CUGCUAAA
	4482	UGAGGAUU CUGAUGA X GAA AGCAGUAG	CUACUGCUA AAUCCUCA
	4486	AACAUGAG CUGAUGA X GAA AUUUAGCA	UGCUAAAUC CUCAUGUU
	4489	AGUAACAU CUGAUGA X GAA AGGAUUUA	UAAAUCCUC AUGUUACU
10	4494	CACUGAGU CUGAUGA X GAA ACAUGAGG	CCUCAUGUU ACUCAGUG
	4495	ACACUGAG CUGAUGA X GAA AACAUAG	CUCAUGUUA CUCAGUGU
	4498	CUAACACU CUGAUGA X GAA AGUAACAU	AUGUUACUC AGUGUUAG
	4504	AUJUCUCU CUGAUGA X GAA ACACUGAG	CUCAGUGUU AGAGAAAUA
	4505	GAUUUCUC CUGAUGA X GAA AACACUGA	UCAGUGUUA GAGAAAUC
15	4513	UUAGGAAG CUGAUGA X GAA AUUUCUCU	AGAGAAAUC CUUCCUAA
	4516	GGUUUAGG CUGAUGA X GAA AGGAUUUC	GAAAUCUU CCUAAACC
	4517	GGGUUUAG CUGAUGA X GAA AAGGAUUU	AAAUCUUC CUAAACCC
	4520	AUUGGGUU CUGAUGA X GAA AGGAAGGA	UCCUUCCUA AACCCAAU
	4533	GAGCAGGG CUGAUGA X GAA AGUCAUJG	CAAUGACUU CCCUGCUC
20	4534	GGAGCAGG CUGAUGA X GAA AAGUCAUU	AAUGACUUC CCUGCUCC
	4541	GGGGGUUG CUGAUGA X GAA AGCAGGGG	UCCCUGCUC CAACCCCC
	4557	CGUGCCCU CUGAUGA X GAA AGGUGGGG	CGCCACCUC AGGGCACG
	4576	CUCAAUCA CUGAUGA X GAA ACUGGUCC	GGACCAGUU UGAUUGAG
	4577	CCUCAAUC CUGAUGA X GAA AACUGGUCC	GACCAGUUU GAUUGAGG
25	4581	AGCUCCUC CUGAUGA X GAA AUCAAACU	AGUUUGAUU GAGGAGCU
	4598	CAUUGGGU CUGAUGA X GAA AUCAGUGC	GCACUGAUC ACCCAAUG
	4610	GGGUACGU CUGAUGA X GAA AUGCAUJG	CAAUGCAUC ACGUACCC
	4615	CAGUGGGGG CUGAUGA X GAA ACGUGAUG	CAUCACGUA CCCCACUG
	4664	CUGGGGCU CUGAUGA X GAA ACGGGCUU	AAGCCCGUU AGCCCCAG
30	4665	CCUGGGGC CUGAUGA X GAA AACGGGCU	AGCCCGUUA GCCCCAGG
	4678	CAGCCAGU CUGAUGA X GAA AUCCCCUG	CAGGGGAUC ACUGGCUG
	4700	ACUCCCGA CUGAUGA X GAA AUGUUGCU	AGCAACAUUC UCGGGAGU
	4702	GGACUCCC CUGAUGA X GAA AGAUGUJG	CAACAUUCU GGGAGUCC

4709	UGCUAGAG CUGAUGA X GAA ACUCCCGA	UCGGGAGUC CUCUAGCA
4712	GCCUGCUA CUGAUGA X GAA AGGACUCC	GGAGGUCCUC UAGCAGGC
4714	AGGCCUGC CUGAUGA X GAA AGAGGACU	AGUCCUCUA GCAGGCCU
4723	ACAUGUCU CUGAUGA X GAA AGGCCUGC	GCAGGCCUA AGACAUGU
5 4802	GCGUCUCA CUGAUGA X GAA AUUCUUUC	GAAAGAAUU UGAGACGC
4803	UGCGUCUC CUGAUGA X GAA AAUUCUUU	AAAGAAUUU GAGACGCA
4840	GCAUUGCUC CUGAUGA X GAA AGCCCCGU	ACGGGGCUC AGCAAUGC
4852	GCCACUGA CUGAUGA X GAA AUGGCAUU	AAUGCCAUU UCAGUGGC
4853	AGCCACUG CUGAUGA X GAA AAUGGCAU	AUGCCAUUU CAGUGGCCU
10 4854	AAGCCACU CUGAUGA X GAA AAAUGGCA	UGCCAUUUC AGUGGCCU
4862	GAGCUGGG CUGAUGA X GAA AGCCACUG	CAGUGGCCU CCCAGCUC
4863	AGAGCUUG CUGAUGA X GAA AAGCCACU	AGUGGCCUUC CCAGCUCU
4870	AAGGGUCA CUGAUGA X GAA AGCUGGGGA	UCCCAGCUC UGACCCUU
4878	AAAUGUAG CUGAUGA X GAA AGGGUCAG	CUGACCCUU CUACAUUU
15 4879	CAAAUGUA CUGAUGA X GAA AAGGGUCA	UGACCCUUC UACAUUUG
4881	CUCAAAUG CUGAUGA X GAA AGAAGGGU	ACCCUUCUA CAUUUGAG
4885	GGCCCCUCA CUGAUGA X GAA AUGUAGAA	UUCUACAUU UGAGGGCC
4886	GGGCCCUUC CUGAUGA X GAA AAUGUAGA	UCUACAUUU GAGGGCCC
4929	AUCCAGAA CUGAUGA X GAA AUGUCCCC	GGGGACAUU UUCUGGAU
20 4930	AAUCCAGA CUGAUGA X GAA AAUGUCCC	GGGACAUUU UCUGGAUU
4931	GAAUCCAG CUGAUGA X GAA AAAUGUCC	GGACAUUUU CUGGAUUC
4932	AGAAUCCA CUGAUGA X GAA AAAAUGUC	GACAUUUUC UGGAUUCU
4938	CCUCCCAAG CUGAUGA X GAA AUCCAGAA	UUCUGGAUU CUGGGAGG
4939	GCCUCCCA CUGAUGA X GAA AAUCCAGA	UCUGGAUUC UGGGAGGC
25 4963	AAAAAAAGA CUGAUGA X GAA AUUJGUCC	GGACAAAUA UCUUUUUU
4965	CCAAAAAA CUGAUGA X GAA AUAUUUGU	ACAAAUAUC UUUUUUGG
4967	UCCAAAAA CUGAUGA X GAA AGAUAUUU	AAUAUCUU UUUUGGAA
4968	GUUCCAAA CUGAUGA X GAA AAGAUAUU	AAUAUCUUU UUUGGAAC
4969	AGUJUCCAA CUGAUGA X GAA AAAGAUAU	AUAUCUUU UUGGAACU
30 4970	UAGUUCCA CUGAUGA X GAA AAAAGAUA	UAUCUUUU UGGAACUA
4971	UUAGUUCC CUGAUGA X GAA AAAAAGAU	AUCUUUUU GGAAACUA
4978	AUUJUGCUU CUGAUGA X GAA AGUJUCCAA	UUGGAACUA AAGCAAAU
4987	AGGUCUAA CUGAUGA X GAA AUUUGCUU	AAGCAAAUU UUAGACCU

4988	AAGGUCUA CUGAUGA X GAA AAUUGCU	AGCAAAUUU UAGACCUU
4989	AAAGGUCU CUGAUGA X GAA AAAUUUGC	GCAAAUUUU AGACCUUU
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4996	CAUAGGU A CUGAUGA X GAA AGGUCUAA	UUAGACCUU UACCUAUG
5 4997	CCAUAGGU CUGAUGA X GAA AAGGUCUA	UAGACCUUU ACCUAUGG
4998	UCCAUAGG CUGAUGA X GAA AAAGGUCU	AGACCUUUA CCUAUGGA
5002	CACUUCCA CUGAUGA X GAA AGGUAAAG	CUUUACCUA UGGAAGUG
5013	GGACAUAG CUGAUGA X GAA ACCACUUC	GAAGUGGUU CUAUGUCC
5014	UGGACAU A CUGAUGA X GAA AACCA CUU	AAGUGGUUC UAUGUCCA
10 5016	AAUGGACA CUGAUGA X GAA AGAACCCAC	GUGGUUCUA UGUCCAUU
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5041	CAAAUCAA CUGAUGA X GAA ACAUGCCA	UGGCAUGUU UUGAUUJUG
5042	ACAAAUC A CUGAUGA X GAA AACAU GCC	GGCAUGUUU UGAUUJGU
5043	UACAAAUC CUGAUGA X GAA AAACAU GC	GCAUGUUUU GAUUJGU
20 5047	GUGCUACA CUGAUGA X GAA AUCAAAAC	GUUUUGAUU UGUAGCAC
5048	AGUGCUAC CUGAUGA X GAA AAUCAAAA	UUUUGAUU GUAGCACU
5051	CUCAGUGC CUGAUGA X GAA ACAAAUCA	UGAUUUGUA GCACUGAG
5069	UCAGAGUU CUGAUGA X GAA AGUGGCCAC	GUGGCACUC AACUCUGA
5074	UGGGCUCA CUGAUGA X GAA AGUUGAGU	ACUCAACUC UGAGCCC
25 5084	GCCAAAAG CUGAUGA X GAA AUGGGCUC	GAGCCCAUA CUUUUGGC
5087	GGAGCCAA CUGAUGA X GAA AGUAUGGG	CCCAUACUU UGGCUCC
5088	AGGAGCCA CUGAUGA X GAA AAGUAUGG	CCAUACUUU UGGCUCCU
5089	GAGGAGCC CUGAUGA X GAA AAAGUAUG	CAUACUUU GGCUCCUC
5094	UACUAGAG CUGAUGA X GAA AGCCAAA	UUUUGGCUC CUCUAGUA
30 5097	UCUUACUA CUGAUGA X GAA AGGAGCCA	UGGCUCUC UAGUAAGA
5099	CAUCUUAC CUGAUGA X GAA AGAGGAGC	GCUCUCUA GUAAGAUG
5102	GUGCAUCU CUGAUGA X GAA ACUAGAGG	CCUCUAGUA AGAUGCAC
5119	CUCUGGCU CUGAUGA X GAA AGUUUUC	UGAAAACUU AGCCAGAG

	5120	ACUCUGGC CUGAUGA X GAA AAGUUUUC	GAAAACUUA GCCAGAGU
	5129	GACAACCU CUGAUGA X GAA ACUCUGGC	GCCAGAGUU AGGUUGUC
	5130	AGACAACC CUGAUGA X GAA AACUCUGG	CCAGAGUUA GGUUGUCU
	5134	CUGGAGAC CUGAUGA X GAA ACCUAACU	AGUUAGGUU GUCUCCAG
5	5137	GGCCUGGA CUGAUGA X GAA ACAACCUA	UAGGUUGUC UCCAGGCC
	5139	AUGGCCUG CUGAUGA X GAA AGACAACC	GGUUGUCUC CAGGCCAU
	5156	UUCAGUGU CUGAUGA X GAA AGGCCAUC	GAUGGCCUU ACACUGAA
	5157	UUUCAGUG CUGAUGA X GAA AAGGCCAU	AUGGCCUUA CACUGAAA
	5170	UAGAAUGU CUGAUGA X GAA ACAUUUJC	GAAA AUGUC ACAUUCUA
10	5175	CAAAAUAAG CUGAUGA X GAA AUGUGACA	UGUCACAUU CUUUUJUG
	5176	CCAAAAUA CUGAUGA X GAA AAUGUGAC	GUCACAUUC UAUUUJUG
	5178	ACCCAAAA CUGAUGA X GAA AGAAUGUG	CACAUUCUA UUUUGGGU
	5180	AUACCCAA CUGAUGA X GAA AUAGAAUG	CAUUCUAUU UGGGUAU
	5181	AAUACCCA CUGAUGA X GAA AAUAGAAU	AUUCUAUU UGGGUAUU
15	5182	UAAAUACCC CUGAUGA X GAA AAAUAGAA	UUCUAUUUU GGGUAUUA
	5187	UAUAUUA CUGAUGA X GAA ACCCAAAA	UUUUGGGUA UUAAUUAUA
	5189	UAUAUAUU CUGAUGA X GAA AUACCCAA	UUGGGUAUU AAUAAUUA
	5190	CUAUUAU CUGAUGA X GAA AAUACCCA	UGGGUAUUA AAUAAUAG
	5193	GGACUUA CUGAUGA X GAA AAUAAUAC	GUAUUAAUA UAUAGUCC
20	5195	CUGGACUA CUGAUGA X GAA AAUUAUUAU	AUUAUUAUA UAGUCCAG
	5197	GUCUGGAC CUGAUGA X GAA AAUUAUUA	UAAUAUUAUA GUCCAGAC
	5200	AGUGUCUG CUGAUGA X GAA ACUUAUUA	UAAUAUAGUC CAGACACU
	5209	AUUGAGUU CUGAUGA X GAA AGUGUCUG	CAGACACUU AACUCAAU
	5210	AAUJUGAGU CUGAUGA X GAA AAGUGUCU	AGACACUUU ACUCAAUU
25	5214	AAGAAAUA CUGAUGA X GAA AGUUAAGU	ACUUAACUC AAUUCUU
	5218	UACCAAGA CUGAUGA X GAA AUUGAGUU	AACUCAAUU UCUUGGUA
	5219	AUACCAAG CUGAUGA X GAA AAUUGAGU	ACUCAAUUU CUUGGUAU
	5220	AAUACCAA CUGAUGA X GAA AAAUUGAG	CUCAAUUUC UGGGUAUU
	5222	AUAAUACC CUGAUGA X GAA AGAAAUG	CAUUUCUU GGUAAUUAU
30	5226	CAGAAUAA CUGAUGA X GAA ACCAAGAA	UUCUUGGUA UUAAUUCUG
	5228	AACAGAAU CUGAUGA X GAA AUACCAAG	CUUGGUAUU AUUCUGUU
	5229	AAACAGAA CUGAUGA X GAA AAUACCAA	UUGGUAUUA UUCUGUUU
	5231	CAAAACAG CUGAUGA X GAA AAUAAUACC	GGUAAUUAUU CUGUUUJUG

	5232	GCAAAACA CUGAUGA X GAA AAUAAAUC	GUAUUAUUC UGUUUUGC
	5236	CUGUGCAA CUGAUGA X GAA ACAGAAUA	UAUUCUGUU UUGCACAG
	5237	ACUGUGCA CUGAUGA X GAA AACAGAAU	AUUCUGUUU UGCACAGU
	5238	AACUGUGC CUGAUGA X GAA AAACAGAA	UUCUGUUUU GCACAGUU
5	5246	UCACAACU CUGAUGA X GAA ACUGUGCA	UGCACAGUU AGUUGUGA
	5247	UUCACAAAC CUGAUGA X GAA AACUGUGC	GCACAGUUUA GUUGUGAA
	5250	UCUUUCAC CUGAUGA X GAA ACUAACUG	CAGUUAGUU GUGAAAGA
	5284	CUCCUCAG CUGAUGA X GAA ACUGCAUU	AAUGCAGUC CUGAGGAG
	5296	AUGGAGAA CUGAUGA X GAA ACUCUCCU	AGGAGAGUU UUCUCCAU
10	5297	UAUGGAGA CUGAUGA X GAA AACUCUCC	GGAGAGUUU UCUCCAUA
	5298	AUAUGGAG CUGAUGA X GAA AAACUCUC	GAGAGUUUU CUCCAUAU
	5299	GAUAUAGGA CUGAUGA X GAA AAAACUCU	AGAGUUUUC UCCAUAU
	5301	UUGAU AUG CUGAUGA X GAA AGAAAACU	AGUUUUCUC CAUAUCAA
	5305	CGUUUJUGA CUGAUGA X GAA AUGGAGAA	UUCUCCAUA UCAAAACG
15	5307	CUCGUUUU CUGAUGA X GAA AUAUGGAG	CUCCAUAUC AAAACGAG
	5336	ACCUUUAUU CUGAUGA X GAA ACCUUUUU	AAAAAGGUC AAUAAGGU
	5340	CUUGACCU CUGAUGA X GAA AUUGACCU	AGGUCAAUA AGGUCAAG
	5345	CUUCCCUU CUGAUGA X GAA ACCUUUAU	AAUAAGGUC AAGGGAAG
	5361	GGUAUAGA CUGAUGA X GAA ACGGGGUC	GACCCCGUC UCUAUACC
20	5363	UUGGUUAUA CUGAUGA X GAA AGACGGGG	CCCCGUCUC UAUACCAA
	5365	GGUUGGUA CUGAUGA X GAA AGAGACGG	CCGUCUCUA UACCAACC
	5367	UUGGUUJGG CUGAUGA X GAA AUAGAGAC	GUCUCUAUA CCAACCAA
	5382	UGUUGGGUG CUGAUGA X GAA AUUGGUUU	AAACCAAUUU CACCAACA
	5383	GUGUJGGU CUGAUGA X GAA AAUUGGUU	AACCAAUUC ACCAACAC
25	5395	UGGGUCCC CUGAUGA X GAA ACUGUGUU	AACACAGUU GGGACCCA
	5417	ACGUGACU CUGAUGA X GAA ACUUCCUG	CAGGAAGUC AGUCACGU
	5421	GGAAACGU CUGAUGA X GAA ACUGACUU	AAGUCAGUC ACGUUUCC
	5426	GAAAAGGA CUGAUGA X GAA ACGUGACU	AGUCACGUU UCCUUUUC
	5427	UGAAAAGG CUGAUGA X GAA AACGUGAC	GUCACGUUU CCUUUUCA
30	5428	AUGAAAAG CUGAUGA X GAA AAACGUGA	UCACGUUUC CUUUCAU
	5431	UAAAUGAA CUGAUGA X GAA AGGAAACG	CGUUUCCUU UUCAUUUA
	5432	UUAAAUGA CUGAUGA X GAA AAGGAAAC	GUUUCUUU UCAUUUAA
	5433	AUAAAUG CUGAUGA X GAA AAAGGAAA	UUUCCUUU CAUUUAAU

5434	CAUUAAA CUGAUGA X GAA AAAAGGAA	UUCUUUUUC AUUUAUG
5437	CCCCAUUA CUGAUGA X GAA AUGAAAAG	CUUUCAUU UAAUGGGG
5438	UCCCCAUU CUGAUGA X GAA AAUGAAAA	UUUUCAUUU AAUGGGGA
5439	AUCCCCAU CUGAUGA X GAA AAAUGAAA	UUUCAUUUA AUGGGGAU
5	5448 GAUAGUGG CUGAUGA X GAA AUCCCCAU	AUGGGGAUU CCACUAUC
	5449 AGAUAGUG CUGAUGA X GAA AAUCCCCA	UGGGGAUUC CACUAUCU
	5454 GUGUGAGA CUGAUGA X GAA AGUGGAAU	AUUCCACUA UCUCACAC
	5456 UAGUGUGA CUGAUGA X GAA AUAGUGGA	UCCACUAUC UCACACUA
	5458 AUUAGUGU CUGAUGA X GAA AGAUAGUG	CACUAUCUC ACACUAAU
10	5464 UUUCAGAU CUGAUGA X GAA AGUGUGAG	CUCACACUA AUCUGAAA
	5467 UCCUUUCA CUGAUGA X GAA AUUAGUGU	ACACUAUC UGAAAGGA
	5489 CGCCAGCU CUGAUGA X GAA AUGCUCUU	AAGAGCAUU AGCUGGCG
	5490 GCGCCAGC CUGAUGA X GAA AAUGCUCU	AGAGCAUUA GCUGGCGC
	5501 GUGCUUAA CUGAUGA X GAA AUGCGCCA	UGGCGCAUA UUAAGCAC
15	5503 AAGUGCUU CUGAUGA X GAA AUAUGCGC	GCGCAUAUU AAGCACUU
	5504 AAAGUGCU CUGAUGA X GAA AAUAUGCG	CGCAUAUUA AGCACUUU
	5511 GGAGCUUA CUGAUGA X GAA AGUGCUUA	UAAGCACUU UAAGCUCC
	5512 AGGAGCUU CUGAUGA X GAA AAGUGCUU	AAGCACUUU AAGCUCCU
	5513 AAGGAGCU CUGAUGA X GAA AAAGUGCU	AGCACUUUA AGCUCCUU
20	5518 UACUCAAG CUGAUGA X GAA AGCUUAAA	UUUAAGCUC CUUGAGUA
	5521 UUUUACUC CUGAUGA X GAA AGGAGCUU	AAGCUCCUU GAGUAAAA
	5526 CACCUUUU CUGAUGA X GAA ACUCAAGG	CCUUGAGUA AAAAGGUG
	5537 AAAUUACA CUGAUGA X GAA ACCACCUU	AAGGUGGUA UGUAAUUU
	5541 GCAUAAA CUGAUGA X GAA ACAUACCA	UGGU AUGUA AUUUAUGC
25	5544 CUUGCAUA CUGAUGA X GAA AUUACAU	UAUGUAAUU UAUGCAAG
	5545 CCUUGCAU CUGAUGA X GAA AAUUACAU	AUGUAAUUU AUGCAAGG
	5546 ACCUUGCA CUGAUGA X GAA AAAUUACA	UGUAAUUUA UGCAAGGU
	5555 UGGAGAAA CUGAUGA X GAA ACCUUGCA	UGCAAGGUA UUUCUCCA
	5557 ACUGGAGA CUGAUGA X GAA AUACCUUG	CAAGGUAAU UCUCAGU
30	5558 AACUGGAG CUGAUGA X GAA AAUACCUU	AAGGUAAUU CUCCAGUU
	5559 CAACUGGA CUGAUGA X GAA AAAUACCU	AGGUAAUJC UCCAGUJG
	5561 CCCAACUG CUGAUGA X GAA AGAAAUA	GUAUUUCUC CAGUUGGG
	5566 UGAGUCCC CUGAUGA X GAA ACUGGAGA	UCUCCAGUU GGGACUCA

	5573	AAUAUCCU CUGAUGA X GAA AGUCCCAA	UUGGGACUC AGGAUAUU
	5579	UUAACUAA CUGAUGA X GAA AUCCUGAG	CUCAGGAUA UUAGUUAA
	5581	CAUUAACU CUGAUGA X GAA AUAUCCUG	CAGGAUAUU AGUAAAUG
	5582	UCAUUAAAC CUGAUGA X GAA AAUAUCCU	AGGAUAUUA GUUAAAUG
5	5585	GGCUCAUU CUGAUGA X GAA ACUAAUAU	AUAAUAGUU AAUGAGCC
	5586	UGGCUCAU CUGAUGA X GAA AACUAAUA	UAUUAGUUA AUGAGCCA
	5596	CUUCUAGU CUGAUGA X GAA AUGGCUCA	UGAGCCAUC ACUAGAAG
	5600	UUUUCUUC CUGAUGA X GAA AGUGAUGG	CCAUCACUA GAAGAAAA
	5615	CAGUUGAA CUGAUGA X GAA AUGGGCUU	AAGCCCAUU UUCAACUG
10	5616	GCAGUUGA CUGAUGA X GAA AAUGGGCU	AGCCCAUUU UCAACUGC
	5617	AGCAGUUG CUGAUGA X GAA AAAUGGGC	GCCCAUUUU CAACUGCU
	5618	AAGCAGUU CUGAUGA X GAA AAAAUGGG	CCCAUUUUC AACUGCUU
	5626	AAGUUUCA CUGAUGA X GAA AGCAGUUG	CAACUGCUU UGAAACUU
	5627	CAAGUUUC CUGAUGA X GAA AAGCAGUU	AACUGCUUU GAAACUJG
15	5634	CCCCAGGC CUGAUGA X GAA AGUUUCAA	UUGAAACUU GCCUGGGG
	5644	CAUGCUCA CUGAUGA X GAA ACCCCAGG	CCUGGGGUC UGAGCAUG
	5661	UGUCUCCC CUGAUGA X GAA AUUCCAU	AUGGGAAUA GGGAGACA
	5674	CCCUUUCC CUGAUGA X GAA ACCCUGUC	GACAGGGUA GGAAAGGG
	5688	CUGAAGAG CUGAUGA X GAA AGGCGCCC	GGGCCGUUA CUCUUCAG
20	5691	ACCCUGAA CUGAUGA X GAA AGUAGGCG	CGCCUACUC UUCAGGGU
	5693	AGACCCUG CUGAUGA X GAA AGAGUAGG	CCUACUCUU CAGGGUCU
	5694	UAGACCCU CUGAUGA X GAA AAGAGUAG	CUACUCUUC AGGGUCUA
	5700	GAUCUUUA CUGAUGA X GAA ACCCUGAA	UUCAGGGUC UAAAGAUC
	5702	UUGAUCUU CUGAUGA X GAA AGACCCUG	CAGGGUCUA AAGAUCAA
25	5708	GCCCACUU CUGAUGA X GAA AUCUUUAG	CUAAAGAUC AAGUGGGC
	5719	AGCGAUCC CUGAUGA X GAA AGGCCAC	GUGGGCCUU GGAUCGCU
	5724	AGCUUAGC CUGAUGA X GAA AUCCAAGG	CCUUGGAUC GCUAAGCU
	5728	AGCCAGCU CUGAUGA X GAA AGCGAUCC	GGAUCGCUA AGCUGGCU
	5737	AUCAAACA CUGAUGA X GAA AGCCAGCU	AGCUGGCUC UGUUUGAU
30	5741	UAGCAUCA CUGAUGA X GAA ACAGAGCC	GGCUCUGUU UGAUGCUA
	5742	AUAGCAUC CUGAUGA X GAA AACAGAGC	GCUCUGUUU GAUGCUAU
	5749	UGCAUAAA CUGAUGA X GAA AGCAUCAA	UUGAUGCUA UUUUAUGCA
	5751	CUUGCAUA CUGAUGA X GAA AUAGCAUC	GAUGCUAUU UAUGCAAG

	5752	ACUUGCAU CUGAUGA X GAA AAUAGCAU	AUGCUAUUU AUGCAAGU
	5753	AACUUGCA CUGAUGA X GAA AAAUAGCA	UGCUAUUUA UGCAAGUU
	5761	UAGACCCU CUGAUGA X GAA ACUUGCAU	AUGCAAGUU AGGGUCUA
	5762	AUAGACCC CUGAUGA X GAA AACUUGCA	UGCAAGUUA GGGUCUAU
5	5767	AAUACAUU CUGAUGA X GAA ACCCUAAC	GUUAGGGUC UAUGUAUU
	5769	UAAAUAACA CUGAUGA X GAA AGACCCUA	UAGGGUCUA UGUAUUUA
	5773	AUCCUAAA CUGAUGA X GAA ACAUAGAC	GUCUAUGUA UUUAGGAU
	5775	GCAUCCUA CUGAUGA X GAA AUACAUAG	CUAUGUAUU UAGGAUGC
	5776	CGCAUCCU CUGAUGA X GAA AAUACAUU	UAUGUAUUU AGGAUGCG
10	5777	GCGCAUCC CUGAUGA X GAA AAAUACAU	AUGUAUUUA GGAUGCGC
	5788	CUGAAGAG CUGAUGA X GAA AGGCGCAU	AUGGCCUA CUCUUCAG
	5791	ACCCUGAA CUGAUGA X GAA AGUAGGCG	CGCCUACUC UUCAGGGU
	5793	AGACCCUG CUGAUGA X GAA AGAGUAGG	CCUACUCUU CAGGGUCU
	5794	UAGACCCU CUGAUGA X GAA AAGAGUAG	CUACUCUUC AGGGUCUA
15	5800	GAUCUUUA CUGAUGA X GAA ACCCUGAA	UUCAGGGUC UAAAGAUC
	5802	UUGAUCUU CUGAUGA X GAA AGACCCUG	CAGGGUCUA AAGAUCAA
	5808	GCCCACUU CUGAUGA X GAA AUCUJJUAG	CUAAAGAUC AAGUGGGC
	5819	AGCGAUCC CUGAUGA X GAA AGGCCAC	GUGGGCCUU GGAUCGCU
	5824	AGCUUAGC CUGAUGA X GAA AUCCAAGG	CCUUGGAUC GCUAAGCU
20	5828	AGCCAGCU CUGAUGA X GAA AGCGAUCC	GGAUCGCUA AGCUGGCU
	5837	AUCAAACA CUGAUGA X GAA AGCCAGCU	AGCUGGCUC UGUUUGAU
	5841	UAGCAUCA CUGAUGA X GAA ACAGAGCC	GGCUCUGUU UGAUGCUA
	5842	AUAGCAUC CUGAUGA X GAA AACAGAGC	GCUCUGUUU GAUGCUAU
	5849	UGCAUAAA CUGAUGA X GAA AGCAUCAA	UJGAUGCUA UUU AUGCA
25	5851	CUUGCAUA CUGAUGA X GAA AUAGCAUC	GAUGCUAUU UAUGCAAG
	5852	ACUUGCAU CUGAUGA X GAA AAUAGCAU	AUGCUAUUU AUGCAAGU
	5853	AACUUGCA CUGAUGA X GAA AAAUAGCA	UGCUAUUUA UGCAAGUU
	5861	UAGACCCU CUGAUGA X GAA ACUUGCAU	AUGCAAGUU AGGGUCUA
	5862	AUAGACCC CUGAUGA X GAA AACUUGCA	UGCAAGUUA GGGUCUAU
30	5867	AAUACAUU CUGAUGA X GAA ACCCUAAC	GUUAGGGUC UAUGUAUU
	5869	UAAAUAACA CUGAUGA X GAA AGACCCUA	UAGGGUCUA UGUAUUUA
	5873	AUCCUAAA CUGAUGA X GAA ACAUAGAC	GUCUAUGUA UUUAGGAU
	5875	ACAUCCUA CUGAUGA X GAA AUACAUAG	CUAUGUAUU UAGGAUGU

	5876	GACAUCCU CUGAUGA X GAA AAUACAU	UAUGUAUUU AGGAUGUC
	5877	AGACAUCC CUGAUGA X GAA AAAUACAU	AUGUAUUUA GGAUGUCU
	5884	AAGGUGCA CUGAUGA X GAA ACAUCCUA	UAGGAUGUC UGCACCUU
	5892	GGCUGCAG CUGAUGA X GAA AGGUGCAG	CUGCACCUU CUGCAGCC
5	5893	UGGCUGCA CUGAUGA X GAA AAGGUGCA	UGCACCUUC UGCAGCCA
	5904	CAGCUUCU CUGAUGA X GAA ACUGGCUG	CAGCCAGUC AGAACGUG
	5930	GAAGCAGC CUGAUGA X GAA AUCCACUG	CAGUGGAUU GCUGCUUC
	5937	UCCCCAAG CUGAUGA X GAA AGCAGCAA	UUGCUGCUU CUUGGGGA
	5938	CUCCCCAA CUGAUGA X GAA AAGCAGCA	UGCUGCUUC UUGGGGAG
10	5940	UUCUCCCC CUGAUGA X GAA AGAACGAG	CUGCUUCUU GGGGAGAA
	5953	AGGAAGCA CUGAUGA X GAA ACUCUUCU	AGAACAGUA UGCUUCU
	5958	AUAAAAGG CUGAUGA X GAA ACCAUACU	AGUAUGCUU CCUUUUAU
	5959	GAUAAAAG CUGAUGA X GAA AAGCAUAC	GUAAUGCUC CUUUUAUC
	5962	AUGGAUAA CUGAUGA X GAA AGGAAGCA	UGCUIUCCUU UUAUCCAU
15	5963	CAUGGAUA CUGAUGA X GAA AAGGAAGC	GCUIUCCUUU UAUCCAUG
	5964	ACAUGGAU CUGAUGA X GAA AAAGGAAG	CUUCCUUUU AUCCAUGU
	5965	UACAUUGGA CUGAUGA X GAA AAAAGGAA	UUCCUUUUUA UCCAUGUA
	5967	AUUACAUAG CUGAUGA X GAA AUAAAAGG	CCUUUUUAUC CAUGUAAU
	5973	AGUJAAAUAU CUGAUGA X GAA ACAUUGGAU	AUCCAUGUA AUUUAACU
20	5976	UACAGUUA CUGAUGA X GAA AUUACAUAG	CAUGUAUUU UAACUGUA
	5977	CUACAGUU CUGAUGA X GAA AAUUACAU	AUGUAUUUU AACUGUAG
	5978	UCUACAGU CUGAUGA X GAA AAAUUACAU	UGUAUUUUUA ACUGUAGA
	5984	UCAGGUUC CUGAUGA X GAA ACAGUUA	UUAACUGUA GAACCUGA
	5996	GUUACUUA CUGAUGA X GAA AGCUCAGG	CCUGAGCUC UAAGUAAC
25	5998	CGGUUACU CUGAUGA X GAA AGAGCUCA	UGAGCUCUA AGUAACCG
	6002	UCUUCGGU CUGAUGA X GAA ACUUAGAG	CUCUAUGUA ACCGAAGA
	6015	CAGAGGCA CUGAUGA X GAA ACAUUCUU	AAGAAUGUA UGCCUCUG
	6021	UAAGAACCA CUGAUGA X GAA AGGCAUAC	GUAAUGCUC UGUUCUUA
	6025	CACAUAAAG CUGAUGA X GAA ACAGAGGC	GCCUCUGUU CUUAUGUG
30	6026	GCACAUAA CUGAUGA X GAA AACAGAGG	CCUCUGUUC UUAUGUGC
	6028	UGGCACAU CUGAUGA X GAA AGAACAGA	UCUGUUCUU AUGUGCCA
	6029	GUGGCACA CUGAUGA X GAA AAGAACAG	CUGUUCUUA UGUGCCAC
	6040	UAAAACAAG CUGAUGA X GAA AUGUGGCA	UGCCACAAUC CUUGUUUA

6043	CUUUAAC CUGAUGA X GAA AGGAUGUG	CACAUCCUU GUUUAAAG
6046	AGCCUUUA CUGAUGA X GAA ACAAGGAAU	AUCCUUGUU UAAAGGCU
6047	GAGCCUUU CUGAUGA X GAA AACAAAGGA	UCCUUGUUU AAAGGCUC
6048	AGAGCCUU CUGAUGA X GAA AAACAAGG	CCUUGUUUA AAGGCUCU
5	6055 CAUACAGA CUGAUGA X GAA AGCCUUUA	UAAAGGCUC UCUGUAUG
6057	UUCAUACA CUGAUGA X GAA AGAGCCUU	AAGGCUCUC UGUAUGAA
6061	UCUCUUCA CUGAUGA X GAA ACAGAGAG	CUCUCUGUA UGAAGAGA
6079	GUGCUGAU CUGAUGA X GAA ACGGUCCC	GGGACCGUC AUCAGCAC
6082	AAUGUGCU CUGAUGA X GAA AUGACGGU	ACCGUCAUC AGCACAUU
10	6090 CACUAGGG CUGAUGA X GAA AUGUGCUG	CAGCACAUU CCCUAGUG
6091	UCACUAGG CUGAUGA X GAA AAUGUGCU	AGCACAUUC CCUAGUGA
6095	AGGCUCAC CUGAUGA X GAA AGGGAAUG	CAUUCCUA GUGAGCCU
6104	GGAGCCAG CUGAUGA X GAA AGGCUCAC	GUGAGCCUA CUGGUCCC
6111	GCUGCCAG CUGAUGA X GAA AGCCAGUA	UACUGGCUC CUGGCAGC
15	6124 UUCCACAA CUGAUGA X GAA AGCCGCUG	CAGCGGCUU UUGUGGAA
6125	CUUCCACA CUGAUGA X GAA AAGCCGCU	AGCGGCCUU UGUGGAAG
6126	UCUUCCAC CUGAUGA X GAA AAAGCCGC	GCGGCUUUU GUGGAAGA
6137	UGGCUAGU CUGAUGA X GAA AGUCUUCC	GGAAGACUC ACUAGCCA
6141	CUUCUGGC CUGAUGA X GAA AGUGAGUC	GACUCACUA GCCAGAAG
20	6166 GUGGAGAG CUGAUGA X GAA ACUGUCCC	GGGACAGUC CUCUCCAC
6169	UUGGUGGA CUGAUGA X GAA AGGACUGU	ACAGUCCUC UCCACCAA
6171	UCUUGGUG CUGAUGA X GAA AGAGGACU	AGUCCUCUC CACCAAGA
6181	UGGAUUUA CUGAUGA X GAA AUCUUGGU	ACCAAGAUC UAAAUCCA
6183	UUJUGGAUJ CUGAUGA X GAA AGAUCUUG	CAAGAUCUA AAUCCAAA
25	6187 UUUGUUUG CUGAUGA X GAA AUUUAGAU	AUCUAAAUC CAAACAAA
6204	UCUGGCUC CUGAUGA X GAA AGCCUGCU	AGCAGGCUA GAGCCAGA
6226	ACAACAAA CUGAUGA X GAA AUUUGUCC	GGACAAAUC UUUGUUGU
6228	GAACAACA CUGAUGA X GAA AGAUUJGU	ACAAAUCUU UGUUGUUC
6229	GGAAACAAC CUGAUGA X GAA AAGAUUJUG	CAAAUCUUU GUUGUUCC
30	6232 AGAGGAAC CUGAUGA X GAA ACAAAAGAU	AUCUUUGUU GUUCCUCU
6235	AGAAGAGG CUGAUGA X GAA ACAACAAA	UUUGUUGUU CCUCUUCU
6236	AAAGAAGAG CUGAUGA X GAA AACAAACAA	UUGUUGUUC CUCUUCUU
6239	GUAAAAGAA CUGAUGA X GAA AGGAACAA	UUGUUCCUC UUCUUUAC

	6241	GUGUAAAG CUGAUGA X GAA AGAGGAAC	GUUCCUCUU CUUUACAC
	6242	UGUGUAAA CUGAUGA X GAA AAGAGGAA	UUCCUCUUC UUUACACA
	6244	UAUGUGUA CUGAUGA X GAA AGAACAGG	CCUCUUCUU UACACAU
	6245	GUAUGUGU CUGAUGA X GAA AAGAACAG	CUCUUCUUU ACACAUAC
5	6246	CGUAUGUG CUGAUGA X GAA AAAGAACG	UCUUCUUUA CACAUACG
	6252	GGUUUGCG CUGAUGA X GAA AUGUGUAA	UUACACAUUA CGCAAACC
	6280	AUUUAUAA CUGAUGA X GAA AUUGCAG	CUGGCAAUU UUUAAAA
	6281	GAUUUAUA CUGAUGA X GAA AAUUGCCA	UGGCAAUU UAUAAAUC
	6282	UGAUUUUAU CUGAUGA X GAA AAAUUGCC	GGCAAUUUU AUAAAUC
10	6283	CUGAUUUUA CUGAUGA X GAA AAAAUUGC	GCAAUUUUA UAAAUCAG
	6285	ACCUGAUU CUGAUGA X GAA AUAAAAAU	AAUUUUUAU AAUCAGGU
	6289	AGUUACCU CUGAUGA X GAA AUUUAUAA	UUUAAAAUC AGGUACU
	6294	CUUCCAGU CUGAUGA X GAA ACCUGAUU	AAUCAGGU ACUGGAAG
	6308	CUGAGUUU CUGAUGA X GAA ACCUCCUU	AAGGAGGUU AACUCAG
15	6309	UCUGAGUU CUGAUGA X GAA AACCUCCU	AGGAGGUUA AACUCAGA
	6314	UUUUUUCU CUGAUGA X GAA AGUUUAAC	GUUAAACUC AGAAAAAA
	6331	AAUUGACU CUGAUGA X GAA AGGUCUUC	GAAGACCUC AGUCAAU
	6335	AGAGAAUU CUGAUGA X GAA ACUGAGGU	ACCUCAGUC AAUUCUCU
	6339	AAGUAGAG CUGAUGA X GAA AUUGACUG	CAGUCAAUU CUCUACUU
20	6340	AAAGUAGA CUGAUGA X GAA AAUUGACU	AGUCAAUUC UCUACUU
	6342	AAAAAGUA CUGAUGA X GAA AGAAUUGA	UCAAUUCUC UACUUUU
	6344	AAAAAAAG CUGAUGA X GAA AGAGAAUU	AAUUCUCUA CUUUUUU
	6347	AAAAAAA CUGAUGA X GAA AGUAGAGA	UCUCUACUU UUUUUUU
	6348	AAAAAAA CUGAUGA X GAA AAGUAGAG	CUCUACUUU UUUUUUU
25	6349	AAAAAAA CUGAUGA X GAA AAAGUAGA	UCUACUUU UUUUUUU
	6350	AAAAAAA CUGAUGA X GAA AAAAGUAG	CUACUUUU UUUUUUU
	6351	AAAAAAA CUGAUGA X GAA AAAAGUA	UACUUUUU UUUUUUU
	6352	AAAAAAA CUGAUGA X GAA AAAAAGU	ACUUUUUU UUUUUUU
	6353	AAAAAAA CUGAUGA X GAA AAAAAAG	CUUUUUUU UUUUUUU
30	6354	AAAAAAA CUGAUGA X GAA AAAAAAAA	UUUUUUUU UUUUUUUC
	6355	GGAAAAAA CUGAUGA X GAA AAAAAAAA	UUUUUUUU UUUUUUCC
	6356	UGGAAAAA CUGAUGA X GAA AAAAAAAA	UUUUUUUU UUUUUCCA
	6357	UUGGAAAA CUGAUGA X GAA AAAAAAAA	UUUUUUUU UUUUCCAA

	6358	UUUGGAAA CUGAUGA X GAA AAAAAAAA	UUUUUUUU UUUCAAA
	6359	AUUGGAA CUGAUGA X GAA AAAAAAAA	UUUUUUUU UUCCAAAU
	6360	GAUJUGGA CUGAUGA X GAA AAAAAAAA	UUUUUUUU UCCAAUC
	6361	UGAUUJGG CUGAUGA X GAA AAAAAAAA	UUUUUUUU CCAAAUCA
5	6362	CUGAUUJG CUGAUGA X GAA AAAAAAAA	UUUUUUUJC CAAUCAG
	6368	UAUUAUCU CUGAUGA X GAA AUUUGGAA	UUCAAAUC AGAUAAJA
	6373	UGGGCUAU CUGAUGA X GAA AUCUGAUU	AAUCAGAU A UAGGCCA
	6376	UGCUGGGC CUGAUGA X GAA AUUAUCUG	CAGAUAAA GCCCAGCA
	6388	GUUAUCAC CUGAUGA X GAA AUUUGCUG	CAGCAAAUA GUGAUAC
10	6394	UUAUUJGU CUGAUGA X GAA AUCACUAU	AUAGUGAU ACAAUA
	6401	UAAGGUUU CUGAUGA X GAA AUUUGUUA	UAACAAAUA AAACCUUA
	6408	GAACAGCU CUGAUGA X GAA AGGUUUUA	UAAAACCUU AGCUGUUC
	6409	UGAACAGC CUGAUGA X GAA AAGGUUUU	AAAACCUUA GCUGUUCA
	6415	AAGACAUG CUGAUGA X GAA ACAGCUAA	UUAGCUGUU CAUGCUU
15	6416	CAAGACAU CUGAUGA X GAA AACAGCUA	UAGCUGUUC AUGCUUG
	6421	GAAAUCAA CUGAUGA X GAA ACAUGAAC	GUUCAUGUC UUGAUUJC
	6423	UUGAAAUC CUGAUGA X GAA AGACAUGA	UCAUGUCUU GAUUCAA
	6427	AUUAUUGA CUGAUGA X GAA AUCAAGAC	GUCUJGAAU UCAAUAU
	6428	AAUUAUUG CUGAUGA X GAA AAUCAAGA	UCUUGAUUU CAAUAAU
20	6429	UAAUUAUU CUGAUGA X GAA AAAUCAAG	CUUGAUUUC AAUAAUUA
	6433	GAAUUAUU CUGAUGA X GAA AUUGAAAU	AUUUCAAAUA AUUAAUJC
	6436	UAAGAAUU CUGAUGA X GAA AUUAUUGA	UCAAAUAAU AAUUCUUA
	6437	UUAAGAAU CUGAUGA X GAA AAUUAUUG	CAAUAAUA AUUCUUA
	6440	UGAUUAAAG CUGAUGA X GAA AUUAAUJA	UAAUUAUUAU CUUAAUCA
25	6441	AUGAUUAA CUGAUGA X GAA AAUUAUUA	AAUUAUUC UUAAUCAU
	6443	UAAUGAUU CUGAUGA X GAA AGAAUUA	UUAAUUCUU AAUCAUUA
	6444	UUAUAGAU CUGAUGA X GAA AAGAAUUA	UAAUUCUUUA AUCAUUA
	6447	CUCUAAA CUGAUGA X GAA AUUAAGAA	UUCUAAAUC AUUAAGAG
	6450	GGUCUCUU CUGAUGA X GAA AUGAUUAA	UAAUCAUU AAGAGACC
30	6451	UGGUCUCU CUGAUGA X GAA AAUGAUUA	UAAUCAUA AGAGACCA
	6461	GUAUUUAU CUGAUGA X GAA AUGGUCUC	GAGACCAUA AUAAAUC
	6464	GGAGUAAU CUGAUGA X GAA AUUAUGGU	ACCAUAAUA AAUACUCC
	6468	AAAAGGAG CUGAUGA X GAA AUUUAUJA	UAAUAAUA CUCCUUUU

	6471	UUGAAAAG CUGAUGA X GAA AGUAUUUA	UAAAUAUCUC CUUUUCAA
	6474	CUCUUGAA CUGAUGA X GAA AGGAGUAU	AUACUCCUU UUCAAGAG
	6475	UCUCUUGA CUGAUGA X GAA AAGGAGUA	UACUCCUUU UCAAGAGA
	6476	UUCUCUUG CUGAUGA X GAA AAAGGAGU	ACUCCUUUU CAAGAGAA
5	6477	UUUCUCUU CUGAUGA X GAA AAAAGGAG	CUCCUUUUC AAGAGAAA
	6497	ACAAUUCU CUGAUGA X GAA AUGGUUUU	AAAACCAUU AGAAUUGU
	6498	AAACAUUC CUGAUGA X GAA AAUGGUUU	AAACCAUUA GAAUUGUU
	6503	UGAGUAAC CUGAUGA X GAA AUUCUAAU	AUUAGAAUU GUUACUCA
	6506	AGCUGAGU CUGAUGA X GAA ACAAUUCU	AGAAUUGUU ACUCAGCU
10	6507	GAGCUGAG CUGAUGA X GAA AACAAUUC	GAAUUGUU A CUCAGCUC
	6510	AAGGAGCU CUGAUGA X GAA AGUAACAA	UUGUUACUC AGCUCCUU
	6515	GUUJUGAAG CUGAUGA X GAA AGCUGAGU	ACUCAGCUC CUUCAAAC
	6518	UGAGUUJUG CUGAUGA X GAA AGGAGCUG	CAGCUCCUU CAAACUCA
	6519	CUGAGUUU CUGAUGA X GAA AAGGAGCU	AGCUCCUUC AAACUCAG
15	6525	ACAAACCU CUGAUGA X GAA AGUUUUGAA	UUCAAACUC AGGUUJUGU
	6530	AUGCUACA CUGAUGA X GAA ACCUGAGU	ACUCAGGUU UGUAGCAU
	6531	UAUGCAC CUGAUGA X GAA AACCUUGAG	CUCAGGUU GUAGCAUA
	6534	AUGUAUGC CUGAUGA X GAA ACAAACCU	AGGUUUGUA GCAUACAU
	6539	GACUCAUG CUGAUGA X GAA AUGCUACA	UGUAGCAUA CAUGAGUC
20	6547	GAUGGAUG CUGAUGA X GAA ACUCAUGU	ACAUGAGUC CAUCCAUC
	6551	GACUGAUG CUGAUGA X GAA AUGGACUC	GAGUCCAUC CAUCAGUC
	6555	CUUUGACU CUGAUGA X GAA AUGGAUGG	CCAUCCAUC AGUCAAAG
	6559	CAUUCUUU CUGAUGA X GAA ACUGAUGG	CCAUCAGUC AAAGAAUG
	6570	CCAGAUGG CUGAUGA X GAA ACCAUUCU	AGAAUGGUU CCAUCUGG
25	6571	UCCAGAUG CUGAUGA X GAA AACCAUUC	GAAUGGUUC CAUCUGGA
	6575	AGACUCCA CUGAUGA X GAA AUGGAACC	GGUUCCAUC UGGAGUCU
	6582	UACAUUAA CUGAUGA X GAA ACUCCAGA	UCUGGAGUC UUAAUGUA
	6584	UCUACAUU CUGAUGA X GAA AGACUCCA	UGGAGUCUU AAUGUAGA
	6585	UUCUACAU CUGAUGA X GAA AAGACUCC	GGAGUCUUA AUGUAGAA
30	6590	UUUCUUUC CUGAUGA X GAA ACAUUAAG	CUUAAUGUA GAAAGAAA
	6609	AUUAAUAC CUGAUGA X GAA AGUCUCCA	UGGAGACUU GUAAUAAU
	6612	CUCAUUAU CUGAUGA X GAA ACAAGUCU	AGACUJUGUA AUAAUGAG
	6615	UAGCUCAU CUGAUGA X GAA AUUACAAG	CUUGUAAUA AUGAGCUA

	6623	UUUGUAAC CUGAUGA X GAA AGCUCAUU	AAUGAGCUA GUUACAAA
	6626	CACUUJUGU CUGAUGA X GAA ACUAGCUC	GAGCUAGUU ACAAAAGUG
	6627	GCACUUUG CUGAUGA X GAA AACUAGCU	AGCUAGUUUA CAAAGUGC
	6637	UAAUGAAC CUGAUGA X GAA AGCACUUU	AAAGUGCUU GUUCAUUA
5	6640	UUUUAAUG CUGAUGA X GAA ACAAGCAC	GUGCUUGUU CAUUAAAAA
	6641	AUUUUAAU CUGAUGA X GAA AACAAAGCA	UGCUIGUUC AUUAAAAAU
	6644	GCUAUUUU CUGAUGA X GAA AUGAACAA	UUGUUCAUU AAAAUAGC
	6645	UGCUAUUU CUGAUGA X GAA AAUGAACAA	UGUCAUUA AAAUAGCA
	6650	UUCAGUGC CUGAUGA X GAA AUUUUAAU	AUUAAAAUA GCACUGAA
10	6662	CAUGUUUC CUGAUGA X GAA AUUUJCAG	CUGAAAAUU GAAACAUG
	6674	UAUCAGUU CUGAUGA X GAA AUUCAUGU	ACAUGAAUU AACUGAUAA
	6675	UUAUCAGU CUGAUGA X GAA AAUUCAUG	CAUGAAUUA ACUGAUAA
	6682	UGGAAUUAU CUGAUGA X GAA AUCAGUUA	UAACUGAUAA AUAUUCCA
	6685	GAUUGGAA CUGAUGA X GAA AUUAUCAG	CUGAUAAUA UUCCAAUC
15	6687	AUGAUUGG CUGAUGA X GAA AUAUUAUC	GAUAAUAUU CCAAUCAU
	6688	AAUGAUUG CUGAUGA X GAA AAUAAUUAU	AUAAUAUUC CAAUCAUU
	6693	UGGCCAAAU CUGAUGA X GAA AUJGGAAU	AUJCCAAUC AUUJGCCA
	6696	AAAUGGCA CUGAUGA X GAA AUGAUJGG	CCAAUCAUU UGCCAUUU
	6697	UAAAUGGC CUGAUGA X GAA AAUGAUUG	CAAUCAUUU GCCAUUJA
20	6703	UUGUCAUA CUGAUGA X GAA AUGGCCAA	UUJGCCAUU UAUGACAA
	6704	UUJGUCAU CUGAUGA X GAA AAUGGCCA	UUGCCAUUU AUGACAAA
	6705	UUUJGUCA CUGAUGA X GAA AAAUGGCA	UGCCAUUUUA UGACAAAA
	6719	UUAGUGCC CUGAUGA X GAA ACCAUUUU	AAAUGGUU GGCACUAA
	6726	UUCUUUGU CUGAUGA X GAA AGUGCCAA	UUGGCACUA ACAAAAGAA
25	6743	CUGAAAGG CUGAUGA X GAA AGUGCUCG	CGAGCACUU CCUUUCAG
	6744	UCUGAAAG CUGAUGA X GAA AAGUGCUC	GAGCACUUC CUUUCAGA
	6747	AACUCUGA CUGAUGA X GAA AGGAAGUG	CACUUCCUU UCAGAGUU
	6748	AAACUCUG CUGAUGA X GAA AAGGAAGU	ACUUCCUUU CAGAGUUU
	6749	GAAACUCU CUGAUGA X GAA AAAGGAAG	CUUCCUUUC AGAGUUUC
30	6755	AUCUCAGA CUGAUGA X GAA ACUCUGAA	UUCAGAGUU UCUGAGAU
	6756	UAUCUCAG CUGAUGA X GAA AACUCUGA	UCAGAGUUU CUGAGAUAA
	6757	UUAUCUCA CUGAUGA X GAA AAACUCUG	CAGAGUUUC UGAGAUAA
	6764	ACGUACAU CUGAUGA X GAA AUCUCAGA	UCUGAGAUAA AUGUACGU

6769	GUUCCACG CUGAUGA X GAA ACAUUUAUC	GAUAAUGUA CGUGGAAC
6781	UCCACCCA CUGAUGA X GAA ACUGUUCC	GGAACAGUC UGGGUGGA
6814	AAGACACA CUGAUGA X GAA ACUUGCAC	GUGCAAGUC UGUGUCUU
6820	ACUGACAA CUGAUGA X GAA ACACAGAC	GUCUGUGUC UUGUCAGU
5	6822 GGACUGAC CUGAUGA X GAA AGACACAG	CUGUGUCUU GUCAGUCC
	6825 CUUGGACU CUGAUGA X GAA ACAAGACA	UGUCUJUGUC AGUCCAAG
	6829 ACUUUCUUG CUGAUGA X GAA ACUGACAA	UUGUCAGUC CAAGAAGU
	6851 CUAAAAAUU CUGAUGA X GAA ACAUCUCG	CGAGAUGUU AAUUUUAG
	6852 CCUAAAAAU CUGAUGA X GAA AACAUUC	GAGAUGUUA AUUUUAGG
10	6855 GUCCCCUA CUGAUGA X GAA AUUAACAU	AUGUUAUUU UUAGGGAC
	6856 GGUCCCUA CUGAUGA X GAA AAUUAACA	UGUUAAUUU UAGGGACC
	6857 GGGGUCCCU CUGAUGA X GAA AAAUUAAC	GUUAUJJUU AGGGACCC
	6858 CGGGUCCC CUGAUGA X GAA AAAUUAAA	UUAAUUUUUA GGGACCCG
	6872 UAGGAAAC CUGAUGA X GAA AGGCACGG	CCGUGCCUU GUUCCUA
15	6875 GGCUAGGA CUGAUGA X GAA ACAAGGCA	UGCCUUGUU UCCUAGCC
	6876 GGGCUAGG CUGAUGA X GAA AACAGGC	GCCUUGUUU CCUAGCCC
	6877 UGGGCUAG CUGAUGA X GAA AAACAAGG	CCUUGUUUC CUAGCCCA
	6880 UUGUGGGC CUGAUGA X GAA AGGAAAC	UGUUUCCUA GCCCACAA
	6901 AUCUGUUU CUGAUGA X GAA AUGUUUGC	GCAAACAUC AAACAGAU
20	6910 CUAGCGAG CUGAUGA X GAA AUCUGUUU	AAACAGAUUA CUCGCUAG
	6913 AGGCUAGC CUGAUGA X GAA AGUAUCUG	CAGAUACUC GCUAGCCU
	6917 AAUGAGGC CUGAUGA X GAA AGCGAGUA	UACUCGCUA GCCUCAUU
	6922 AUUUAAA CUGAUGA X GAA AGGCUAGC	GCUAGCCUC AUUUAAA
	6925 UCAAUUUA CUGAUGA X GAA AUGAGGCU	AGCCUCAUU UAAAUGA
25	6926 AUCAUUU CUGAUGA X GAA AAUGAGGC	GCCUCAUUU AAAUUGAU
	6927 AAUCAAUU CUGAUGA X GAA AAAUGAGG	CCUCAUUUA AAUUGAUJU
	6931 CUUAAAUC CUGAUGA X GAA AUUUAAA	AUUJAAAUAU GAUAAAAG
	6935 CCUCUUU CUGAUGA X GAA AUCAUUU	AAAUGAUU AAAGGAGG
	6936 UCCUCUU CUGAUGA X GAA AAUCAAUU	AAUUGAUUA AAGGAGGA
30	6951 CGGCCAAA CUGAUGA X GAA AUGCACUC	GAGUGCAUC UUUGGCCG
	6953 GUCGGCCA CUGAUGA X GAA AGAUGCAC	GUGCAUCUU UGGCCGAC
	6954 UGUCGGCC CUGAUGA X GAA AAGAUGCA	UGCAUCUUU GGCGACAA
	6970 CACACAGU CUGAUGA X GAA ACACCACU	AGUGGUGUA ACUGUGUG

	7026	AACACACA CUGAUGA X GAA ACACCCAC	GUGGGUGUA UGUGUGUU
	7034	AUGCACAA CUGAUGA X GAA ACACACAU	AUGUGUGUU UUGUGCAU
	7035	UAUGCACCA CUGAUGA X GAA AACACACA	UGUGUGUUU UGUGCAUA
	7036	UUAUGCAC CUGAUGA X GAA AAACACAC	GUGUGUUUU GUGCAUAA
5	7043	UAAAUAAGU CUGAUGA X GAA AUGCACAA	UUGUGCAUA ACUAUUUA
	7047	UCCUUAAA CUGAUGA X GAA AGUUAUGC	GCAUAACUA UUUAGGA
	7049	UUUCCUUA CUGAUGA X GAA AUAGUUAU	AUAACUAUU UAAGGAAA
	7050	GUUUCCUU CUGAUGA X GAA AAUAGUUA	UAACUAUU AAGGAAAC
	7051	AGUUUCCU CUGAUGA X GAA AAAUAGUU	AACUAUUUA AGGAAACU
10	7065	AACUUUAA CUGAUGA X GAA AUUCCAGU	ACUGGAAUU UAAAAGUU
	7066	UAACUUUA CUGAUGA X GAA AAUUCCAG	CUGGAAUUU UAAAGUUA
	7067	GUAAACUU CUGAUGA X GAA AAAUUCCA	UGGAAUJJU AAAGUUAC
	7068	AGUAACUU CUGAUGA X GAA AAAAUCC	GGAAUUUUA AAGUUACU
	7073	AUAAAAGU CUGAUGA X GAA ACUUUAAA	UUUAAAGUU ACUUUUAU
15	7074	UAUAAAAG CUGAUGA X GAA AACUUJAA	UUAAAGUUA CUUUUAUA
	7077	UUGUAUAA CUGAUGA X GAA AGUAACUU	AAGUUACUU UUAUACAA
	7078	UUJUGUUA CUGAUGA X GAA AAGUAACU	AGUUACUUU UAUACAAA
	7079	GUUUGUAU CUGAUGA X GAA AAAGUAAC	GUUACUUUU AUACAAAC
	7080	GGUUUGUA CUGAUGA X GAA AAAAGUAA	UUACUUUUA UACAAACC
20	7082	UJGGUUUG CUGAUGA X GAA AUAAAAGU	ACUUUUAUA CAAACCAA
	7095	GUAGCAUA CUGAUGA X GAA AUUCUUGG	CCAAGAAUA UAUGCUAC
	7097	CUGUAGCA CUGAUGA X GAA AUAUUCUU	AAGAAUUA UGCUCACAG
	7102	UAAAUCUG CUGAUGA X GAA AGCAUUA	UAAAUGCUA CAGAUUA
	7108	CUGUCUUA CUGAUGA X GAA AUCUGUAG	CUACAGAUUA UAAGACAG
25	7110	GUCUGUCU CUGAUGA X GAA AUAUCUGU	ACAGAUUAUA AGACAGAC
	7124	UAGGACCA CUGAUGA X GAA ACCAUGUC	GACAUGGUU UGGUCCUA
	7125	AUAGGACC CUGAUGA X GAA AACCAUGU	ACAUGGUUU GGUCCUAU
	7129	AAAUAUAG CUGAUGA X GAA ACCAAACC	GGUUUUGGUC CUUAUUU
	7132	UAGAAAUA CUGAUGA X GAA AGGACCAA	UUGGUCCUA UAUUUCUA
30	7134	ACUAGAAA CUGAUGA X GAA AUAGGACC	GGUCCUAUA UUUCUAGU
	7136	UGACUAGA CUGAUGA X GAA AUAUAGGA	UCCUAAUAUU UCUAGUCA
	7137	AUGACUAG CUGAUGA X GAA AAUAUAGG	CCUAAUJJU CUAGUCAU
	7138	CAUGACUA CUGAUGA X GAA AAAUAUAG	CUAAUJUC UAGUCAUG

7140	AUCAUGAC CUGAUGA X GAA AGAAAUAU	AUAUUUCUA GUCAUGAU
7143	UUCAUCAU CUGAUGA X GAA ACUAGAAA	UUUCUAGUC AUGAUGAA
7155	AUACAAAA CUGAUGA X GAA ACAUUCAU	AUGAAUGUA UUUUGUAU
7157	GUAUACAA CUGAUGA X GAA AUACAUUC	GAAUGUAUU UUGUAUAC
5	7158 GGUAUACA CUGAUGA X GAA AAUACAUU	AAUGUAUUU UGUAIACC
7159	UGGUAUAC CUGAUGA X GAA AAAUACAU	AUGUAUUUU GUAUACCA
7162	AGAUGGUA CUGAUGA X GAA ACAAAAUA	UAUUUUGUA UACCAUCU
7164	GAAGAUGG CUGAUGA X GAA AUACAAAA	UUUUGUAUA CCAUCUUC
7169	UAUAUGAA CUGAUGA X GAA AUGGUUAU	UAUACCAUC UUCAUUAU
10	7171 AUUUAUAG CUGAUGA X GAA AGAUGGUA	UACCAUCUU CAUAAUAU
7172	UAUUUAU CUGAUGA X GAA AAGAUGGU	ACCAUCUUC AUAAUAAU
7175	GUAUAAA CUGAUGA X GAA AUGAAGAU	AUCUUCAUA UAAUAAUAC
7177	AAGUAAU CUGAUGA X GAA AU AUGAAG	CUUCAUUA AUAUACUU
7180	UUUAAGUA CUGAUGA X GAA AUUUAUAG	CAUAAUUA UACUUAAA
15	7182 UUUUUAAG CUGAUGA X GAA AUAUUAUA	UAUAAUUA CUUAAAAA
7185	AUAIJUUU CUGAUGA X GAA AGUAAUUAU	AAUAUACUU AAAAUUAU
7186	AAUAUUU CUGAUGA X GAA AAGUAAU	AAUAUACUUA AAAAUUU
7192	UUAAGAAA CUGAUGA X GAA AUUUUJAA	UUAAAAAUA UUUCUUA
7194	AAUUAAGA CUGAUGA X GAA AUAUUUU	AAAAAUUU UCUUAAU
20	7195 CAAUUAAG CUGAUGA X GAA AAUAUUUU	AAAAUAUUU CUUAAUUG
7196	CCAAUUA CUGAUGA X GAA AAAUAUU	AAAUUUUC UUAAUUGG
7198	UCCCAAUU CUGAUGA X GAA AGAAAUAU	UAUUUCUU AAUUGGGA
7199	AUCCCAAU CUGAUGA X GAA AAGAAAUA	UAUUUCUUA AUUGGGAU
7202	CAAAUCCC CUGAUGA X GAA AUUAAGAA	UUCUUAUU GGGAUUUG
25	7208 CGAUUACA CUGAUGA X GAA AUCCCAAU	AUUGGGAUU UGUAAUCG
7209	ACGAUUAC CUGAUGA X GAA AAUCCCAA	UUGGGAUUU GUAAUCGU
7212	GGUACGAU CUGAUGA X GAA ACAAAUCC	GGAUUUGUA AUCGUACC
7215	GUUGGUAC CUGAUGA X GAA AUUACAAA	UUUGUAAUC GUACCAAC
7218	UAAGUUGG CUGAUGA X GAA ACGAUUAC	GUAAUCGUA CCAACUUA
30	7225 UAUCAAUU CUGAUGA X GAA AGUUGGU	UACCAACUU AAUUGUA
7226	UUAUCAAU CUGAUGA X GAA AAGUUGGU	ACCAACUUA AUUGUA
7229	AGUUUAUC CUGAUGA X GAA AUUAAGUU	AACUUAUUU GAUAAACU
7233	GCCAAGUU CUGAUGA X GAA AUCAAUUA	UAUUUGUA AACUUGGC

	7238	CAGUUGCC CUGAUGA X GAA AGUUUAUC	GAUAAAACUU GGCAACUG
	7249	GAACAUAA CUGAUGA X GAA AGCAGUUG	CAACUGCUU UUAUGUUC
	7250	AGAACAUAA CUGAUGA X GAA AAGCAGUU	AACUGCUUU UAUGUUCU
	7251	CAGAACAU CUGAUGA X GAA AAAGCAGU	ACUGCUUUU AUGUUCUG
5	7252	ACAGAACCA CUGAUGA X GAA AAAAGCAG	CUGCUUUUA UGUUCUGU
	7256	GGAGACAG CUGAUGA X GAA ACAUAAAA	UUUUAUGUU CUGUCUCC
	7257	AGGAGACA CUGAUGA X GAA AACAUAAA	UUUUAUGUUC UGUCUCCU
	7261	UGGAAGGA CUGAUGA X GAA ACAGAACCA	UGUUCUGUC UCCUCCCA
	7263	UAUGGAAG CUGAUGA X GAA AGACAGAA	UUCUGUCUC CUUCCAUA
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	7267	AAUUUAUG CUGAUGA X GAA AAGGAGAC	GUCUCCUUC CAUAAAU
	7271	GAAAAAUU CUGAUGA X GAA AUGGAAGG	CCUUCCAUA AAUUUUUC
	7275	UUJUGAAA CUGAUGA X GAA AUUUAUGG	CCAUAUUU UUUCAAAA
	7276	AUJUUGAA CUGAUGA X GAA AAUUAUG	CAUAAAUU UUCAAAAU
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	7278	GUAUUUUG CUGAUGA X GAA AAAUUUJA	UAAAUUUUU CAAAAUAC
	7279	AGUAUUUU CUGAUGA X GAA AAAAUUU	AAAUUUUUC AAAAUACU
	7285	UGAAUUAG CUGAUGA X GAA AUUJUGAA	UUCAAAUA CUAAUUC
	7288	UGUUGAAU CUGAUGA X GAA AGUAUUU	AAAAUACUA AUUCAACA
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	7292	UCUUUGUU CUGAUGA X GAA AAUUAGUA	UACUAAUUC AACAAAGA
	7308	AAAAAAA CUGAUGA X GAA AGCUUUUU	AAAAGCUC UUUUUUU
	7310	GGAAAAAA CUGAUGA X GAA AGAGCUUU	AAAGCUCUU UUUUUUCC
	7311	AGGAAAAA CUGAUGA X GAA AAGAGCUU	AAGCUCUUU UUUUUCCU
25	7312	UAGGAAAA CUGAUGA X GAA AAAGAGCU	AGCUCUUUU UUUUCCUA
	7313	UUAGGAAA CUGAUGA X GAA AAAAGAGC	GCUCUUUUU UUCCUAA
	7314	UUJAGGAA CUGAUGA X GAA AAAAGAG	CUCUUUUUU UUCCUAAA
	7315	UUUJAGGA CUGAUGA X GAA AAAAAGA	UCUUUUUUU UCCUAAA
	7316	AUJJUAGG CUGAUGA X GAA AAAAAG	CUUUUUUUU CCUAAA
30	7317	UAUUUJAG CUGAUGA X GAA AAAAAGAA	UUUUUUUUC CUAAAUA
	7320	GUUUAUUU CUGAUGA X GAA AGGAAAAA	UUUUUCCUA AAAUAAAC
	7325	UUJUGAGUU CUGAUGA X GAA AUUUAAGG	CCUAAAUA AACUCAA
	7330	AUAAAUUU CUGAUGA X GAA AGUUUAUU	AAUAAAACUC AAAUUUAU

	7335	CAAGGAUA CUGAUGA X GAA AUUUGAGU	ACUCAAAUU UAUCCUUG
	7336	ACAAGGAU CUGAUGA X GAA AAUJUGAG	CUCAAAUUU AUCCUUGU
	7337	AACAAGGA CUGAUGA X GAA AAAUJUGA	UCAAAUUA UCCUUGUU
	7339	UAAAACAAG CUGAUGA X GAA AUAAAUUU	AAAUUUAUC CUUGUUUA
5	7342	CUCUAAAC CUGAUGA X GAA AGGAUAAA	UUUAUCCUU GUUUAGAG
	7345	CUGCUCUA CUGAUGA X GAA ACAAGGAU	AUCCUUGUU UAGAGCAG
	7346	UCUGCUCU CUGAUGA X GAA AACAAAGGA	UCCUUGUUU AGAGCAGA
	7347	CUCUGCUC CUGAUGA X GAA AAACAAGG	CCUUGUUUA GAGCAGAG
	7362	UUUUUCUU CUGAUGA X GAA AUUUUJUCU	AGAAAAAUU AAGAAAAA
10	7363	GUUUUUCU CUGAUGA X GAA AUUUUJUC	GAAAAAUUA AGAAAAC
	7373	CCAUUUCU CUGAUGA X GAA AGUUUUUC	GAAAACUU UGAAAUGG
	7374	ACCAUUUC CUGAUGA X GAA AAGUUUUU	AAAACUUU GAAAUGGU
	7383	UUUUUUGA CUGAUGA X GAA ACCAUUJC	GAAUUGGUC UCAAAAAA
	7385	AAUUUUUU CUGAUGA X GAA AGACCAUU	AAUGGUCUC AAAAAAUU
15	7393	UAUUUAGC CUGAUGA X GAA AUUUUJUG	CAAAAAAUU GCUAAAUA
	7397	AAAAAUUU CUGAUGA X GAA AGCAAUUU	AAAUJGCUA AAUAUUUU
	7401	AUUGAAAA CUGAUGA X GAA AUUAGCA	UGCUCAAAUA UUUCAAU
	7403	CCAUUGAA CUGAUGA X GAA AUAUUJAG	CUAAAUUUU UUCAAUGG
	7404	UCCAUGA CUGAUGA X GAA AAUAUUJA	UAAAUAUUU UCAAUGGA
20	7405	UUCCAUUG CUGAUGA X GAA AAAUAUUJ	AAAUAUUUU CAAUGGAA
	7406	UUUCCAUU CUGAUGA X GAA AAAUUAUU	AAUAUUUUC AAUGGAAA
	7418	CUAACAUU CUGAUGA X GAA AGUUUUCC	GGAAAACUA AAUGUUAG
	7424	GCUCACU CUGAUGA X GAA ACAUUUAG	CUAAAUGUU AGUUUAGC
	7425	AGCUAAAC CUGAUGA X GAA AACAUUJA	UAAAUGUUA GUUUAGCU
25	7428	AUCAGCUA CUGAUGA X GAA ACTAACAU	AUGUUJAGUU UAGCUGAU
	7429	AAUCAGCU CUGAUGA X GAA AACUAACA	UGUUJAGUUU AGCUGAUU
	7430	CAAUCAGC CUGAUGA X GAA AAACUAAC	GUUAGUUUA GCUGAUJG
	7437	CCCCAUAC CUGAUGA X GAA AUCAGCUA	UAGCUGAUU GUAUGGGG
	7440	AAACCCCA CUGAUGA X GAA ACAAUCAG	CUGAUUGUA UGGGGUUU
30	7447	GGUUCGAA CUGAUGA X GAA ACCCCAU	UAUGGGGUU UUCGAACC
	7448	AGGUUCGA CUGAUGA X GAA AACCCCAU	AUGGGGUUU UCGAACCU
	7449	AAGGUUCG CUGAUGA X GAA AAACCCCA	UGGGGUUUU CGAACCUU
	7450	AAAGGUUC CUGAUGA X GAA AAAACCCC	GGGGUUUUC GAACCUUU

	7457	AAAAGUGA CUGAUGA X GAA AGGUUCGA	UCGAACCUU UCACUUUU
	7458	AAAAAGUG CUGAUGA X GAA AAGGUUCG	CGAACCUUU CACUUUUU
	7459	CAAAAAGU CUGAUGA X GAA AAAGGUUC	GAACCUUUC ACUUUUUG
	7463	CAAACAAA CUGAUGA X GAA AGUGAAAG	CUUCACUU UUUGUUUG
5	7464	ACAAACAA CUGAUGA X GAA AAGUGAAA	UUUCACUUU UUGUUUGU
	7465	AACAAACA CUGAUGA X GAA AAAGUGAA	UUCACUUUU UGUUUGUU
	7466	AAACAAAC CUGAUGA X GAA AAAAGUGA	UCACUUUUU GUUUGUUU
	7469	GUAAAACA CUGAUGA X GAA ACAAAAAG	CUUUJUGUU UGUUUUAC
	7470	GGUAAAAC CUGAUGA X GAA AACAAAAA	UUUUJGUUU GUUUUACC
10	7473	AUAGGUAA CUGAUGA X GAA ACAACAA	UUGUJUGUU UJACCUAU
	7474	AAUAGGU CUGAUGA X GAA AACAAACA	UGUJUGUUU UACCUAUU
	7475	AAAUAGGU CUGAUGA X GAA AAACAAAC	GUUUGUUUU ACCUAUUU
	7476	GAAAUAGG CUGAUGA X GAA AAAACAAA	UUUGUUUUU CCUAAUUC
	7480	UUGUGAAA CUGAUGA X GAA AGGUAAAA	UUUJACCUA UUUCACAA
15	7482	AGUUGUGA CUGAUGA X GAA AUAGGUAA	UUACCUAUU UCACAACU
	7483	CAGUUGUG CUGAUGA X GAA AAUAGGU	UACCUAUUU CACAACUG
	7484	ACAGUUGU CUGAUGA X GAA AAAUAGGU	ACCUAUUUC ACAACUGU
	7495	UGGCCAUU CUGAUGA X GAA ACACAGUU	AACUGUGUA AAUUGCAC
	7499	UUAUJGGC CUGAUGA X GAA AUUUACAC	GUGUAAAUA GCCAAUAA
20	7506	ACAGGAAU CUGAUGA X GAA AUUGGCAA	UUGCCAAUA AUUCCUGU
	7509	UGGACAGG CUGAUGA X GAA AUUAUJGG	CCAAUAAUU CCUGUCCA
	7510	AUGGACAG CUGAUGA X GAA AAUUAUUG	CAAUAAUUC CUGUCCAU
	7515	UUUUCAUG CUGAUGA X GAA ACAGGAAU	AUUCCUGUC CAUGAAAA
	7531	CACUGGAU CUGAUGA X GAA AUUUGCAU	AUGCAAAUU AUCCAGUG
25	7532	ACACUGGA CUGAUGA X GAA AAUUJUGCA	UGCAAAUUA UCCAGUGU
	7534	CUACACUG CUGAUGA X GAA AUAAUJUG	CAAAUUAUC CAGUGUAG
	7541	AAUUAUAC CUGAUGA X GAA ACACUGGA	UCCAGUGUA GAUAUAUU
	7545	GUCAAAUA CUGAUGA X GAA AUCUACAC	GUGUAGAUUA UAUUUGAC
	7547	UGGUCAAA CUGAUGA X GAA AUaucuac	GUAGAUUA UUUGACCA
30	7549	GAUGGUCA CUGAUGA X GAA AUUAUACU	AGAUUAUUA UGACCAUC
	7550	UGAUGGUC CUGAUGA X GAA AAUUAUAC	GAUUAUUU GACCAUCA
	7557	CAUAGGGU CUGAUGA X GAA AUGGUCAA	UUGACCAUC ACCCUAUG
	7563	AAUAUCCA CUGAUGA X GAA AGGGUGAU	AUCACCCUA UGGAUAUU

	7569	CUAGCCAA CUGAUGA X GAA AUCCAUAG	CUAUGGAUA UGGCUAG
	7571	AACUAGCC CUGAUGA X GAA AUAUCCAU	AUGGAAUUA GGCUAGUU
	7576	GGCAAAAC CUGAUGA X GAA AGCCAAUA	UAUUGGCUA GUUUUGCC
	7579	AAAGGCAA CUGAUGA X GAA ACUAGCCA	UGGCUAGUU UUGCCUUU
5	7580	UAAAAGGC CUGAUGA X GAA AACUAGCC	GGCUAGUUU UGCCUUUA
	7581	AUAAAGGC CUGAUGA X GAA AAACUAGC	GCUAGUUU GCCUUUAU
	7586	GCUUAAUA CUGAUGA X GAA AGGCAAAA	UUUUGCCUU UAUUAAGC
	7587	UGCUUAAU CUGAUGA X GAA AAGGCAAA	UUUGCCUUU AUUAAGCA
	7588	UUGCUUAA CUGAUGA X GAA AAAGGCAA	UUGCCUUUA UUAAGCAA
10	7590	AUUUGCuu CUGAUGA X GAA AUAAAGGC	GCCUUUAUU AAGCAAAU
	7591	AAUUJUGCU CUGAUGA X GAA AAUAAAGG	CCUUUAUUA AGCAAAAU
	7599	CUGAAAUG CUGAUGA X GAA AUUUGCuu	AAGCAAAUU CAUUCAG
	7600	GCUGAAA CUGAUGA X GAA AAUUJUGCU	AGCAAAUUC AUUUCAGC
	7603	CAGGCUGA CUGAUGA X GAA AUGAAUUU	AAAUCAUU UCAGCCUG
15	7604	UCAGGCUG CUGAUGA X GAA AAUGAAUU	AAUUCAUUU CAGCCUGA
	7605	UUCAGGCU CUGAUGA X GAA AAAUGAAU	AUUCAUUC AGCCUGAA
	7617	UAUAGGCA CUGAUGA X GAA ACAUUCAG	CUGAAUGUC UGCCUAUA
	7623	AGAAUAAUA CUGAUGA X GAA AGGCAGAC	GUCUGCCUA UAAUUCU
	7625	AGAGAAUA CUGAUGA X GAA AUAGGCAG	CUGCCUAUA UAAUCUCU
20	7627	GCAGAGAA CUGAUGA X GAA AUAUAGGC	GCCUUAUUA UUCUCUGC
	7629	GAGCAGAG CUGAUGA X GAA AUAUAUAG	CUAUUAUUA CUCUGCUC
	7630	AGAGCAGA CUGAUGA X GAA AAUUAUUA	UAAUAAUUC UCUGCUCU
	7632	AAAGAGCA CUGAUGA X GAA AGAAUUA	UAAUATUCUC UGCUCUUU
	7637	AAUACAAA CUGAUGA X GAA AGCAGAGA	UCUCUGCUC UUUGUAUU
25	7639	AGAAUACA CUGAUGA X GAA AGAGCAGA	UCUGCUCUU UGUAAUUCU
	7640	GAGAAUAC CUGAUGA X GAA AAGAGCAG	CUGCUCUUU GUAAUUCUC
	7643	AAGGAGAA CUGAUGA X GAA ACAAAGAG	CUCUUUGUA UUCUCCUU
	7645	CAAAGGAG CUGAUGA X GAA AUACAAAG	CUUUGUAUU CUCCUUUG
	7646	UCAAAGGA CUGAUGA X GAA AAUACAAA	UUUGUAUUC UCCUUUGA
30	7648	GUUCAAAG CUGAUGA X GAA AGAAUACA	UGUAUUCUC CUUUGAAC
	7651	CGGGGUUCA CUGAUGA X GAA AGGAGAAU	AUUCUCCUU UGAACCCG
	7652	ACGGGUUC CUGAUGA X GAA AAGGAGAA	UUCUCCUUU GAACCCGU
	7661	GAUGUUUU CUGAUGA X GAA ACGGGUUC	GAACCCGUU AAAACAUC

7662 GGAUGUUU CUGAUGA X GAA AACGGGUU AACCCGUUA AAACAUCC

7669 UGCCACAG CUGAUGA X GAA AUGUUUU UAAAACAUC CUGUGGCA

Where "X" represents stem II region of a HH ribozyme (Hertel et al., 1992 *Nucleic Acids Res.* 20 3252). The length of stem II

5 may be \geq 2 base-pairs.

Table III: Human flt1 VEGF Receptor-Hairpin Ribozyme and Substrate Sequence

nt.	Position	HP Ribozyme Sequence	Substrate
16	CGGGAGG AGAA GAGAGG ACCAGAGAACACACGUUGGUACAUUACCUGUA	CCUCUCG GCU CCUCCCG	
5 39	CCGCUCGG AGAA GCCGCC ACCAGAGAACACACGUUGGUACAUUACCUGUA	GGCGGG GCU CGGAGGG	
180	CCGCCAGA AGAA GUCCUC ACCAGAGAACACACGUUGGUACAUUACCUGUA	GAGGACG GAC UCUGGGG	
190	AACGACCC AGAA GCCAGA ACCAGAGAACACACGUUGGUACAUUACCUGUA	UCUGGGG GCC GGGUCGUU	
278	GCGGCAC AGAA GGACCC ACCAGAGAACACACGUUGGUACAUUACCUGUA	GGGUCCU GCU GUGGGGC	
290	GACAGCUG AGAA GCGGCC ACCAGAGAACACACGUUGGUACAUUACCUGUA	GCGGGCU GCU CAGCUGUC	
10 295	AAGCAAGC AGAA GAGCAG ACCAGAGAACACACGUUGGUACAUUACCUGUA	CUGCUA GCU GUUCGCUU	
298	GAGAAGCA AGAA GCUGAG ACCAGAGAACACACGUUGGUACAUUACCUGUA	CUCAGCU GUC UGGUUCUC	
302	CUGUGAGA AGAA GACAGC ACCAGAGAACACACGUUGGUACAUUACCUGUA	GUUCGCU GCU UCUCACAG	
420	CAUUUAUG AGAA GCUUCC ACCAGAGAACACACGUUGGUACAUUACCUGUA	GGAAGCA GCC CAUAAAUG	
486	CUUCCACA AGAA GAUTUUA ACCAGAGAACACACGUUGGUACAUUACCUGUA	UAAAUCU GCC UGUGGAAG	
15 537	UUUGCUG AGAA GUGUUC ACCAGAGAACACACGUUGGUACAUUACCUGUA	GAACACA GCU CAAGCAA	
565	AUAUTUGC AGAA GUAGAA ACCAGAGAACACACGUUGGUACAUUACCUGUA	UUCUACA GCU GCAAAUAU	
721	CGUAACCC AGAA GGGAAU ACCAGAGAACACACGUUGGUACAUUACCUGUA	AUUCCU GCC GGGUUACG	
786	CGUUUUCC AGAA GGGAU ACCAGAGAACACACGUUGGUACAUUACCUGUA	GAUCCCU GAU GGAAAACG	
863	CUUCACAG AGAA GAAGCC ACCAGAGAACACACGUUGGUACAUUACCUGUA	GGCUCUCU GAC CUGUGAAG	

1056	UUUUTUUC AGAA GGGUAA ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	UUACCCU GAU GAAAAAA
1301	GCGGUAA AGAA GCUUGC ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	GCAAGGG GUC UUACGGGC
1310	UCAUAGAG AGAA GGUAG ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	CUUACCG GCU CUCUAGUA
1389	AAAUGCG AGAA GAUTUC ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	GAAAUUCU GCU CGCUAUUU
5 1535	UUUCGUAA AGAA GGGUU ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	AACCCCA GAU UUACGAAA
1566	AGAGCCGG AGAA GGAAC ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	GUUCCA GAC CGGGCUCU
1572	GGGUAGAG AGAA GGGUCU ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	AGACCCG GCU CUCUACCC
1604	CGGUACAA AGAA GGAAUU ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	AAAUCU GAC UGUACCG
1824	AUUCUAGA AGAA GCCACA ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	UGGGGU GAC UCUAGAAU
10 1908	UUUCCGAC AGAA GUGAUA ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	UAUCACA GAU GUCCCCAA
1949	CUCUUCC AGAA GCAUTU ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	AAAUGCC GAC GGAAGGAG
1973	CUGUGCAA AGAA GUUUCU ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	UGAAACU GUC UTGACACAG
2275	AGUGGUGG AGAA GCUGAU ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	AUCAGCA GUU CCACCAU
2321	ACCAAGUG AGAA GAGGCC ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	AGCCUCA GAU CACUUGGU
15 2396	UUUCAAUA AGAA GCGUGG ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	GCACGGU GUU UAUUGAAA
2490	GUUCCUJUG AGAA GUGAGG ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	CCUCACU GUU CAAGGAAC
2525	UUAGAGUG AGAA GCUUU ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	UGGAGGU GAU CACUCUAA
2625	GAUAGGUAGAA GUCUUU ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	AAAGACU GAC UACCUAUC
2652	GGAACUUC AGAA GGGUCC ACCAGAGAACACAGTUGGGUACAUUACUGGUAA	GGACCCA GAU GAAGUTUCC

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2684	CAUAAGGG AGAA GCUCAC ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	GUGAGCG GCU CCCUUAUG
2816	CAGCCACA AGAA GGCACG ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	CGUGCCG GAC UGUGGCUG
2873	GGUCAGUC AGAA GAGCUU ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	AAGCUCU GAU GACUGAGC
2930	AGGCCUCCC AGAA GGUUAA ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	UUAAACC GCU GGGAGCCU
5 2963	CAAUCACC AGAA GAGGC ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	GGCCUCU GAU GGUGAUTUG
3157	UUCUGGAA AGAA GGAGCU ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	AGCUCCG GCU UTACAGGA
3207	UAGAAACC AGAA GAAUC ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	GGAUUCU GAC GGUTUCUA
3211	CUUGUAGA AGAA GUCAGA ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	UCUGACG GUU UCUACAAG
3245	UGUAAGAA AGAA GAUCUU ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	AAGAUCU GAU UTUCUACA
10 3256	CACUUGAA AGAA GUAAGA ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	UCUJACU GUU UUCAAGUG
3287	UUCUGGAA AGAA GGAACU ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	AGUUCCU GUC UUCCAGAA
3402	CUCACAUAGAGAA GGGUUC ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	GAACCCC GAU UAUGUGAG
3580	CCUCAGGC AGAA GCAAA ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	UUTUGCA GUC GCCUGAGG
3641	CCAGGAUG AGAA GAUAGA ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	UCUJAUCU GAU CAUGCUGG
15 3655	UCUGUGCC AGAA GUCCAG ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	CUGGACU GCU GGCACAGA
3810	UCAGAGAA AGAA GGAGUU ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	AACUCCU GCC UUCUCUGA
3846	AACUUCGG AGAA GAAAUU ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	UAUJUCA GCU CGGAAGUU
3873	CUGACAUAGAGAA GAGGUU ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	AAGCUCU GAU GAUGUCAG
3995	GAGAGGCC AGAA GAGUGC ACCAGAGAAAACACAGUTUGGUUACAUUACCUGGU	GCACUCU GUU GGCCUCUC

4100	UGACAUCA AGAA GCCCG ACCAGAGAACACAGGUUGGUACAUUACCUGGU	CGGGCU GUC UGAUGUCA
4104	CUGGUGAC AGAA GACAGC ACCAGAGAACACAGGUUGGUACAUUACCUGGU	GCUUGUCU GAU GUAGCAG
4120	AUGGCAGA AGAA GGGCCU ACCAGAGAACACAGGUUGGUACAUUACCUGGU	AGGCCA GUU UCUGCCAU
4135	GUGCCAC AGAA GGAU ACCAGUUG ACCAGAGAACACAGGUUGGUACAUUACCUGGU	CAUCCA GCU GUAGCAC
5	4210 GGGGGG AGAA GCACGC ACCAGAGAACACAGGUUGGUACAUUACCUGGU	GCGUGCU GCU CCCGCC
4217	AGUCUGGG AGAA GGGAGC ACCAGAGAACACAGGUUGGUACAUUACCUGGU	GCUCCCC GCC CCCAGACU
4224	GAGUUGUA AGAA GGGGG ACCAGAGAACACAGGUUGGUACAUUACCUGGU	GCCCCA GAC UACAACUC
4382	CAAAAGC AGAA GGCUCC ACCAGAGAACACAGGUUGGUACAUUACCUGGU	GGAGCCA GCU GCUUJJUG
4385	UCACAAA AGAA GCUGGC ACCAGAGAACACAGGUUGGUACAUUACCUGGU	GCGAGCU GCU UUUUGUGA
10	4537 GGGGUUGG AGAA GGGAG ACCAGAGAACACAGGUUGGUACAUUACCUGGU	CUCUCCU GCU CCAACCC
4573	CUCAUCA AGAA GGUCU ACCAGAGAACACAGGUUGGUACAUUACCUGGU	AGGACCA GUU UGAUUGAG
4594	AUUGGGUG AGAA GUGCAG ACCAGAGAACACAGGUUGGUACAUUACCUGGU	CUGCACU GAU CACCAAU
4628	GGCUGGAG AGAA GGGCCA ACCAGAGAACACAGGUUGGUACAUUACCUGGU	UGGGCCA GCC CUGAGCC
4636	GGGUUJUG AGAA GCAGGG ACCAGAGAACACAGGUUGGUACAUUACCUGGU	CCUGCA GCC CAAACCC
15	4866 AGGGUCAG AGAA GGGAG ACCAGAGAACACAGGUUGGUACAUUACCUGGU	CUUCCA GCU CUGACCCU
4871	GUAGAAGG AGAA GAGCUG ACCAGAGAACACAGGUUGGUACAUUACCUGGU	CAGCUCU GAC CCUUCUAC
4905	CGCUGUCC AGAA GCUCCU ACCAGAGAACACAGGUUGGUACAUUACCUGGU	AGGAGCA GAU GGACAGCG
5233	CUGUGCAA AGAA GAAUAA ACCAGAGAACACAGGUUGGUACAUUACCUGGU	UUAUUCU GUU UGGCACAG
5281	CUCCUCAG AGAA GCAUUTU ACCAGAGAACACAGGUUGGUACAUUACCUGGU	AAAUGCA GUC CUGAGGAG

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5319	UUUCUCC AGAA GCCCUC ACCAGAGAAACACAGUUGGUACAUUACCUGUA	GAGGGCU GAU GGAGGAA
5358	GGUAUAGA AGAA GGGCU ACCAGAGAAACACAGUUGGUACAUUACCUGUA	AGACCCC GUC UCUAUACC
5392	UGGGUCCC AGAA GUGUG ACCAGAGAAACACAGUUGGUACAUUACCUGUA	CAACACA GUU GGGACCCA
5563	UGAGUCCC AGAA GGAGAA ACCAGAGAAACACAGUUGGUACAUUACCUGUA	UUCUCCA GUU GGGACCUA
5 5622	AGUUUCAA AGAA GUUGAA ACCAGAGAAACACAGUUGGUACAUUACCUGUA	UUCAACU GCU UUGAACU
5738	UAGCAUCA AGAA GAGCCA ACCAGAGAAACACAGUUGGUACAUUACCUGUA	UGGCUCU GUU UGAUGCUA
5838	UAGCAUCA AGAA GAGCCA ACCAGAGAAACACAGUUGGUACAUUACCUGUA	UGGCCUCU GUU UGAUGCUA
5933	CCCCAAGA AGAA GCAAUC ACCAGAGAAACACAGUUGGUACAUUACCUGUA	GAUJGCU GCU UCUTGGGG
6022	CACAUAG AGAA GAGGA ACCAGAGAAACACAGUUGGUACAUUACCUGUA	UGCCUCU GUU CUUAUGUG
10 6120	UCCACAAA AGAA GCUGGC ACCAGAGAAACACAGUUGGUACAUUACCUGUA	GGCAGCG GCU UUUGUGGA
6163	GUGGAGAG AGAA GUCCCA ACCAGAGAAACACAGUUGGUACAUUACCUGUA	UGGGACA GUC CUCUCCAC
6270	AAAUGCC AGAA GUCACA ACCAGAGAAACACAGUUGGUACAUUACCUGUA	UGUGACA GCU GGCAUUU
6412	AAGACAUG AGAA GCUAAG ACCAGAGAAACACAGUUGGUACAUUACCUGUA	CUUAGCU GUU CAUGUCUU
6511	UTUGAAGG AGAA GAGUAA ACCAGAGAAACACAGUUGGUACAUUACCUGUA	UUACUCA GCU CCUTCAAA
15 6778	UCCACCCA AGAA GUUCCCA ACCAGAGAAACACAGUUGGUACAUUACCUGUA	UGGAACA GUC UGGUGGA
6826	ACUUCUUG AGAA GACAAG ACCAGAGAAACACAGUUGGUACAUUACCUGUA	CUUGUCA GUC CAAGAAGU
7245	AACAUAAA AGAA GUUGGC ACCAGAGAAACACAGUUGGUACAUUACCUGUA	GGCAACU GCU UUUAGUU
7258	UGGAAGGA AGAA GAACAU ACCAGAGAAACACAGUUGGUACAUUACCUGUA	AUGGUUCU GUC UCCUUCCA
7433	CCCAUACA AGAA GCUAAA ACCAGAGAAACACAGUUGGUACAUUACCUGUA	UUJAGCU GAU UGU AUGGG

7512	UUUUC AUG AGAA GGAAU ACCAGAGAACACACGUUGGGUACAUUACUGGUAA	AUUCCU GUC CAUGAAAA
7606	GACAUCA AGAA GAAUG ACCAGAGAACACACGUUGGGUACAUUACUGGUAA	CAUUCA GCC UGAUGUC
7618	AAUAUUA AGAA GACAUU ACCAGAGAACACACGUUGGGUACAUUACUGGUAA	AAUGUCU GCC UAUAUAU
7633	AUACAAAG AGAA GAGAAU ACCAGAGAACACACGUUGGGUACAUUACUGGUAA	AUUCUCU GCU CUNUGUAU

Table IV: Human KDR VEGF Receptor-Hammerhead Ribozyme and Substrate Sequence

nt. Posi- tion	HH Ribozyme Sequence	Substrate
5		
21	CACAGGGC CUGAUGA X GAA ACGGCCAG	CUGGCCGUC GCCCUGUG
33	UCCACGCA CUGAUGA X GAA AGCCACAG	CUGUGGCUC UGCGUGGA
56	AACCCACA CUGAUGA X GAA AGGCGGCC	GGCCGCCUC UGUGGGUU
64	ACUAGGCA CUGAUGA X GAA ACCCACAG	CUGUGGGUU UGCCUAGU
10	65 CACUAGGC CUGAUGA X GAA AACCCACA	UGUGGGUUU GCCUAGUG
	70 AGAAACAC CUGAUGA X GAA AGGCAAAC	GUUUGCCUA GUGUUUCU
	75 UCAAGAGA CUGAUGA X GAA ACACUAGG	CCUAGUGUU UCUCUUGA
	76 AUCAAGAG CUGAUGA X GAA AACACUAG	CUAGUGUUU CUCUUGAU
	77 GAUCAAGA CUGAUGA X GAA AAACACUA	UAGUGUUUC UCUUGAUC
15	79 CAGAUCAA CUGAUGA X GAA AGAAACAC	GUGUUUCUC UUGAUCUG
	81 GGCAGAUC CUGAUGA X GAA AGAGAAAC	GUUUCUCUU GAUCUGCC
	85 CCUGGGCA CUGAUGA X GAA AUCAAGAG	CUCUUGAUC UGCCCAGG
	96 UGUAUGCU CUGAUGA X GAA AGCCUGGG	CCCAGGCUC AGCAUACA
	102 UCUUUUJUG CUGAUGA X GAA AUGCUGAG	CUCAGCAUA CAAAAAGA
20	114 AUUGUAAG CUGAUGA X GAA AUGCUUU	AAAGACAUUA CUUACAAU
	117 UUAAUUGU CUGAUGA X GAA AGUAUGUC	GACAUACUU ACAAUUAA
	118 CUUAAUUG CUGAUGA X GAA AAGUAUGU	ACAUACUUA CAAUUAAG
	123 UUAGCCUU CUGAUGA X GAA AUUGUAAG	CUUACAAUU AAGGCUAA
	124 AUUAGCCU CUGAUGA X GAA AAUUGUAA	UUACAAUUA AGGCUAAU
25	130 AGUUGUAU CUGAUGA X GAA AGCCUAAA	UUAAGGCUA AUACAACU
	133 AAGAGUUG CUGAUGA X GAA AUUAGCCU	AGGCUAAUA CAACUCUU
	139 AAUUGGAA CUGAUGA X GAA AGUUGUAU	AUACAACUC UUCAAAUU
	141 GUAAUUUG CUGAUGA X GAA AGAGUUGU	ACAACUCUU CAAAUUAC
	142 AGUAAUUU CUGAUGA X GAA AAGAGUUG	CAACUCUUC AAAUUACU
30	147 CUGCAAGU CUGAUGA X GAA AUUUGAAG	CUUCAAAUU ACUUGCAG
	148 CCUGCAAG CUGAUGA X GAA AAUUGGAA	UUCAAAUUUA CUUGCAGG
	151 UCCCCUGC CUGAUGA X GAA AGUAAUUU	AAAUUACUU GCAGGGGA

170	GCCAGUCC CUGAUGA X GAA AGUCCCUC	GAGGGACUU GGACUGGC
180	UUGGGCCA CUGAUGA X GAA AGCCAGUC	GACUGGCCUU UGGCCCAA
181	AUUGGGCC CUGAUGA X GAA AAGCCAGU	ACUGGCCUUU GGCCCCAU
190	ACUCUGAU CUGAUGA X GAA AUUGGCC	GGCCCAAUA AUCAGAGU
5 193	GCCACUCU CUGAUGA X GAA AUUAUUUGG	CCAAUAAUC AGAGUGGC
243	UUACAGAA CUGAUGA X GAA AGGCCAUC	GAUGGCCUC UUCUGUAA
245	UCUUACAG CUGAUGA X GAA AGAGGCCA	UGGCCUCUU CUGUAAGA
246	GUCUUACA CUGAUGA X GAA AAGAGGCC	GGCCUCUUC UGUAAGAC
250	GAGUGUCU CUGAUGA X GAA ACAGAAGA	UCUUCUGUA AGACACUC
10 258	GGAAUUGU CUGAUGA X GAA AGUGUCUU	AAGACACUC ACAAUUCC
264	ACUUUUGG CUGAUGA X GAA AUUGUGAG	CUCACAAUU CAAAAGGU
265	CACUUUUG CUGAUGA X GAA AAUUGUGA	UCACAAUUC CAAAAGUG
276	UCAUUUCC CUGAUGA X GAA AUCACUUU	AAAGUGAUC GGAAAUGA
296	AGCACUUG CUGAUGA X GAA AGGCCUCA	UGGAGCCUA CAAGUGC
15 305	CCCGGUAG CUGAUGA X GAA AGCACUUG	CAAGUGCUU CUACCGGG
306	UCCCGGUA CUGAUGA X GAA AAGCACUU	AAGUGCUUC UACCGGGA
308	UUUCCCGG CUGAUGA X GAA AGAACGAC	GUGCUUCUA CGGGAAAA
323	CCGAGGCC CUGAUGA X GAA AGUCAGUU	AACUGACUU GGCCUCGG
329	AAAUGACC CUGAUGA X GAA AGGCCAAG	CUUGGCCUC GGUCAUUU
20 333	ACAUAAA CUGAUGA X GAA ACCGAGGC	GCCUCGGUC AUUUAUGU
336	UAGACAU A CUGAUGA X GAA AUGACCGA	UCGGUCAUU UAUGUCUA
337	AUAGACAU CUGAUGA X GAA AAUGACCG	CGGUCAUUU AUGUCUAU
338	CAUAGACA CUGAUGA X GAA AAAUGACC	GGUCAUUUA UGUCUAUG
342	UGAACAU A CUGAUGA X GAA ACAUAAA	AUUUAUGUC UAUGUUC
25 344	CUUGAAC A CUGAUGA X GAA AGACAUAA	UUAUGUCUA UGUUCAAG
348	UAAUCUUG CUGAUGA X GAA ACAUAGAC	GUCUAUGUU CAAGAUUA
349	GUAAUCUU CUGAUGA X GAA AACAUAGA	UCUAUGUUC AAGAUUAC
355	AGAUCUGU CUGAUGA X GAA AUCUUGAA	UUCAAGAUU ACAGAUCU
356	GAGAUCUG CUGAUGA X GAA AAUCUUGA	UCAAGAUUA CAGAUCUC
30 362	UAAAUGGA CUGAUGA X GAA AUCUGUAA	UUACAGAUC UCCAUUUA
364	AAUAAAUG CUGAUGA X GAA AGAUCUGU	ACAGAUCUC CAUUUAU
368	AAGCAAUA CUGAUGA X GAA AUGGAGAU	AUCUCCAUU UAUUGC
369	GAAGCAAU CUGAUGA X GAA AAUGGAGA	UCUCCAUUU AUUGC

	370	AGAAGCAA CUGAUGA X GAA AAAUGGAG	CUCCAUUUA UUGCUUCU
	372	ACAGAACG CUGAUGA X GAA AUAAAUGG	CCAUUUAUU GCUUCUGU
	376	ACUAACAG CUGAUGA X GAA AGCAAUAA	UUAUUGCUU CUGUUAGU
	377	CACUAACA CUGAUGA X GAA AAGCAAUA	UAUUGCUC UGUUAGUG
5	381	UGGUCACU CUGAUGA X GAA ACAGAACG	GCUUCUGUU AGUGACCA
	382	UUGGUACAC CUGAUGA X GAA AACAGAACG	CUUCUGUUA GUGACCAA
	399	AUGUACAC CUGAUGA X GAA ACUCCAUG	CAUGGAGUC GUGUACAU
	404	CAGUAAUG CUGAUGA X GAA ACACGACU	AGUCGUGUA CAUUACUG
	408	UUCUCAGU CUGAUGA X GAA AUGUACAC	GUGUACAUU ACUGAGAA
10	409	GUUCUCAG CUGAUGA X GAA AAUGUACA	UGUACAUUA CUGAGAAC
	438	AGACAAUGG CUGAUGA X GAA AUCACCAC	GUGGUGAUU CCAUGUCU
	439	GAGACAUG CUGAUGA X GAA AAUCACCA	UGGUGAUUC CAUGUCUC
	445	GGACCCGA CUGAUGA X GAA ACAUGGAA	UUCCAUGUC UCGGGUCC
	447	AUGGACCC CUGAUGA X GAA AGACAUGG	CCAUGUCUC GGGUCCAU
15	452	UUGAAAUG CUGAUGA X GAA ACCCGAGA	UCUCGGGUC CAUUUCAA
	456	AGAUUUGA CUGAUGA X GAA AUGGACCC	GGGUCCAUU UCAAAUCU
	457	GAGAUUUG CUGAUGA X GAA AAUGGACC	GGUCCAUUU CAAUUCUC
	458	UGAGAUUU CUGAUGA X GAA AAAUGGAC	GUCCAUUUC AAAUCUCA
	463	CACGUUGA CUGAUGA X GAA AUUUGAAA	UUUCAAAUC UCAACGUG
20	465	GACACGUU CUGAUGA X GAA AGAUUUGA	UCAAAUCUC AACGUGUC
	473	CACAAAGU CUGAUGA X GAA ACACGUUG	CAACGUGUC ACUUUGUG
	477	CUUGCACA CUGAUGA X GAA AGUGACAC	GUGUCACUU UGUGCAAG
	478	UCUUGCAC CUGAUGA X GAA AAGUGACA	UGUCACUUU GUGCAAGA
	488	UUUCUGGG CUGAUGA X GAA AUCUUGCA	UGCAAGAUU CCCAGAAA
25	503	CAGGAACA CUGAUGA X GAA AUCUCUUU	AAAGAGAUU UGUUCCUG
	504	UCAGGAAC CUGAUGA X GAA AAUCUCUU	AAGAGAUUU GUUCCUGA
	507	CCAUCAGG CUGAUGA X GAA ACAAAUCU	AGAUUUGUU CCUGAUGG
	508	ACCAUCAG CUGAUGA X GAA AACAAAU	GAUUUGUUC CUGAUGGU
	517	AAUUCUGU CUGAUGA X GAA ACCAUCAG	CUGAUGGUU ACAGAAUU
30	525	UCCCAGGA CUGAUGA X GAA AUUCUGUU	AACAGAAUU UCCUGGGA
	526	GUCCCAGG CUGAUGA X GAA AAUUCUGU	ACAGAAUUU CCUGGGAC
	527	UGUCCCAG CUGAUGA X GAA AAAUUCUG	CAGAAUUUC CUGGGACA
	548	GAAUAGUA CUGAUGA X GAA AGCCCUUC	GAAGGGCUU UACUAUUC

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549	GGAAAUAGU CUGAUGA X GAA AAGCCUU	AAGGGCUUU ACUAUUCC
550	GGGAAUAG CUGAUGA X GAA AAAGCCU	AGGGCUUUA CUAUUCCC
553	GCUGGGAA CUGAUGA X GAA AGUAAAAGC	GCUUUACUA UUCCCAGC
555	UAGCUGGG CUGAUGA X GAA AUAGUAAA	UUUACUAUU CCCAGCUA
5	556 GUAGCUGG CUGAUGA X GAA AAUAGUAA	UUACUAUUC CCAGCUAC
563	UGAUCAUG CUGAUGA X GAA AGCUGGGA	UCCCAGCUA CAUGAUCA
570	GCAUAGCU CUGAUGA X GAA AUCAUGUA	UACAUGAUC AGCUAUGC
575	UGCCAGCA CUGAUGA X GAA AGCUGAUC	GAUCAGCUA UGCUGGCA
588	UCACAGAA CUGAUGA X GAA ACCAUGCC	GGCAUGGUC UUCUGUGA
10	590 CUUCACAG CUGAUGA X GAA AGACCAUG	CAUGGUCUU CUGUGAAG
591	GCUUCACA CUGAUGA X GAA AAGACCAU	AUGGUCUUC UGUGAAGC
606	UCAUCAUU CUGAUGA X GAA AUUUUJUGC	GCAAAAAAUU AAUGAUGA
607	UUCAUCAU CUGAUGA X GAA AAUUUUJUG	CAAAAAAUUA AUGAUGAA
619	AGACUGGU CUGAUGA X GAA ACUUUCAU	AUGAAAGUU ACCAGUCU
15	620 UAGACUGG CUGAUGA X GAA AACUUUCA	UGAAAGUUA CCAGUCUA
626	ACAUAAUA CUGAUGA X GAA ACUGGUAA	UUACCAGUC UAUUAUGU
628	GUACAUAA CUGAUGA X GAA AGACUGGU	ACCAGUCUA UUAUGUAC
630	AUGUACAU CUGAUGA X GAA AUAGACUG	CAGUCUAUU AUGUACAU
631	UAUGUACA CUGAUGA X GAA AAUAGACU	AGUCUAUUA UGUACAU
20	635 CAACUAUG CUGAUGA X GAA ACAUAAUA	UAUUUAUGUA CAUAGUUG
639	ACGACAAC CUGAUGA X GAA AUGUACAU	AUGUACAUUA GUUGUCGU
642	ACAACGAC CUGAUGA X GAA ACUAUGUA	UACAUAGUU GUCGUUGU
645	CCUACAAAC CUGAUGA X GAA ACAACUAU	AUAGUUGUC GUUGUAGG
648	UACCCUAC CUGAUGA X GAA ACGACAAC	GUUGUCGUU GUAGGGUA
25	651 CUAUACCC CUGAUGA X GAA ACAACGAC	GUCGUUGUA GGGUAUAG
656	AAAUCUA CUGAUGA X GAA ACCCUACAU	UGUAGGGUA UAGGAUUU
658	AUAAAUCU CUGAUGA X GAA AUACCCUA	UAGGGUAUA GGAAUUAU
663	ACAUCAUA CUGAUGA X GAA AUCCUAUA	UAUAGGAAU UAUGAUGU
664	CACAUCAU CUGAUGA X GAA AAUCCUAU	AUAGGAUUU AUGAUGUG
30	665 CCACAUCA CUGAUGA X GAA AAAUCCUA	UAGGAUUUA UGAUGUGG
675	GGACUCAG CUGAUGA X GAA ACCACAUC	GAUGUGGUU CUGAGUCC
676	CGGACUCA CUGAUGA X GAA AACCACAU	AUGUGGUUC UGAGUCCG
682	AUGAGACG CUGAUGA X GAA ACUCAGAA	UUCUGAGUC CGUCUCAU

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686	UUCCAUGA CUGAUGA X GAA ACGGACUC	GAGUCCGUC UCAUGGAA
688	AAUUCCAU CUGAUGA X GAA AGACGGAC	GUCCGUCUC AUGGAAUU
696	GAUAGUUC CUGAUGA X GAA AUUCCAUG	CAUGGAAUU GAACUAUC
702	CCAACAGA CUGAUGA X GAA AGUUCAAU	AUUGAACUA UCUGUUGG
5 704	CUCCAACA CUGAUGA X GAA AUAGUUCA	UGAACUAUC UGUUGGAG
708	UUUUCUCC CUGAUGA X GAA ACAGAUAG	CUAUCGUU GGAGAAAA
720	UUUAAGAC CUGAUGA X GAA AGCUUUUC	GAAAAGCUU GUCUUAAG
723	CAAUUUAA CUGAUGA X GAA ACAAGCUU	AAGCUUGUC UUAAAUG
725	UACAAUUU CUGAUGA X GAA AGACAAGC	GCUUGUCUU AAAUUGUA
10 726	GUACAAUU CUGAUGA X GAA AAGACAAG	CUUGUCUUA AAUUGUAC
730	UGCUGUAC CUGAUGA X GAA AUUUAAGA	UCUUAAAUA GUACAGCA
733	UCUUGCG CUGAUGA X GAA ACAAUUJA	UAAAUUGUA CAGCAAGA
750	CCCACAUU CUGAUGA X GAA AGUUCAGU	ACUGAACUA AAUGUGGG
762	UUGAAGUC CUGAUGA X GAA AUCCCCAC	GUGGGGAUU GACUCAA
15 767	CCCAGUUG CUGAUGA X GAA AGUCAAUC	GAUUGACUU CAACUGGG
768	UCCCAGUU CUGAUGA X GAA AAGUCAAU	AUJGACUUC AACUGGGA
779	AAGAAGGG CUGAUGA X GAA AUUCCAG	CUGGGAAUA CCCUUCUU
784	CUUCGAAG CUGAUGA X GAA AGGGUAUU	AAUACCCUU CUUCGAAG
785	GCUUCGAA CUGAUGA X GAA AAGGGUAU	AUACCCUUC UUCGAAGC
20 787	AUGCUUCG CUGAUGA X GAA AGAAGGGU	ACCCUUCUU CGAACAU
788	GAUGCUUC CUGAUGA X GAA AAGAAGGG	CCCUUCUUC GAAGCAUC
796	CUUAUGCU CUGAUGA X GAA AUGCUUCG	CGAACAUUC AGCAUAAG
802	AAGUUUCU CUGAUGA X GAA AUGCUGAU	AUCAGCAUA AGAAACUU
810	CGGUUUAC CUGAUGA X GAA AGUUUCUU	AAGAAACUU GUAAACCG
25 813	UCUCGGUU CUGAUGA X GAA ACAAGUUU	AAACUJGUA AACCGAGA
825	UGGGUUUU CUGAUGA X GAA AGGUCUCG	CGAGACCUC AAAACCCA
836	CACUCCCA CUGAUGA X GAA ACUGGGUU	AACCCAGUC UGGGAGUG
857	UGCUCAAA CUGAUGA X GAA AUUUCUUC	GAAGAAAUU UUUGAGCA
858	GUGCUCAA CUGAUGA X GAA AAUUCUU	AAGAAAUUU UUGAGCAC
30 859	GGUGCUCA CUGAUGA X GAA AAAUUCU	AGAAAAUUU UGAGCACC
860	AGGUGCUC CUGAUGA X GAA AAAAUUC	GAAAUUUU GAGCACC
869	CUAUAGUU CUGAUGA X GAA AGGUGCUC	GAGCACCUC AACUAUAG
870	UCUAUAGU CUGAUGA X GAA AAGGUGCU	AGCACCUCU ACUUAAGA

	874	ACCAUCUA CUGAUGA X GAA AGUUAAGG	CCUUAACUA UAGAUGGU
	876	ACACCAUC CUGAUGA X GAA AUAGUJAA	UUAACUAUA GAUGGUGU
	885	CUCCGGGU CUGAUGA X GAA ACACCAUC	GAUGGUGUA ACCCGGAG
	905	AGGUGUAC CUGAUGA X GAA AUCCUJUGG	CCAAGGAUU GUACACCU
5	908	CACAGGUG CUGAUGA X GAA ACAAUCCU	AGGAUUGUA CACCUGUG
	923	GCCCACUG CUGAUGA X GAA AUGCUGCA	UGCAGCAUC CAGUGGGC
	956	CCCUGACA CUGAUGA X GAA AUGUGCUG	CAGCACAUU UGUCAGGG
	957	ACCCUGAC CUGAUGA X GAA AAUGUGCU	AGCACAUU GUCAAGGU
	960	UGGACCCU CUGAUGA X GAA ACAAAUGU	ACAUUUGUC AGGGUCCA
10	966	UUUUCAUG CUGAUGA X GAA ACCCUGAC	GUCAGGGUC CAUGAAAA
	979	AGCAACAA CUGAUGA X GAA AGGUUUUU	AAAAACCUU UUGUUGCU
	980	AAGCAACA CUGAUGA X GAA AAGGUUUU	AAAACCUU UGUUGCUU
	981	AAAGCAAC CUGAUGA X GAA AAAGGUUU	AAACCUUUU GUUGCUUU
	984	CCAAAAGC CUGAUGA X GAA ACAAAAGG	CCUUUUGUU GCUUUUGG
15	988	ACUUCCAA CUGAUGA X GAA AGCAACAA	UUGUUGCUU UUGGAAGU
	989	CACUUCCA CUGAUGA X GAA AAGCAACA	UGUUGCUUU UGGAAGUG
	990	CCACUJCC CUGAUGA X GAA AAAGCAAC	GUJGCUUUU GGAAGUGG
	1007	CCACCAGA CUGAUGA X GAA AUUCCAUG	CAUGGAAUC UCUGGUGG
	1009	UUCCACCA CUGAUGA X GAA AGAUUCCA	UGGAAUCUC UGGUGGAA
20	1038	GGGAUUCU CUGAUGA X GAA ACACGCUC	GAGCGUGUC AGAAUCCC
	1044	UUCGCAGG CUGAUGA X GAA AUUCUGAC	GUCAGAAUC CCUGCGAA
	1055	AACCAAGG CUGAUGA X GAA ACUUCGCA	UGCGAAGUA CCUUGGUU
	1059	GGGUAAACC CUGAUGA X GAA AGGUACUU	AAGUACCUU GGUUACCC
	1063	GGGUGGGU CUGAUGA X GAA ACCAAGGU	ACCUUGGUU ACCCACCC
25	1064	GGGGUGGG CUGAUGA X GAA AACCAAGG	CCUUGGUUA CCCACCCC
	1080	UACCAUUU CUGAUGA X GAA AUUUCUGG	CCAGAAAUA AAAUGGUA
	1088	CAUUUUUA CUGAUGA X GAA ACCAUUUU	AAAAUGGUA UAAAAAUG
	1090	UCCAUUUU CUGAUGA X GAA AUACCAUU	AAUGGUUA AAAAUGGA
	1101	UCAAGGGG CUGAUGA X GAA AUUCCAUU	AAUGGAAUA CCCCUUGA
30	1107	UUGGACUC CUGAUGA X GAA AGGGGUAU	AUACCCUU GAGUCAA
	1112	UGUGAUUG CUGAUGA X GAA ACUCAAGG	CCUUGAGUC CAAUCACA
	1117	AAUJUGUGU CUGAUGA X GAA AUUGGACU	AGUCCAAUC ACACAAUU
	1125	CCCGCUUU CUGAUGA X GAA AUUGUGUG	CACACAAUU AAAGCGGG

	1126	CCCCGCUU CUGAUGA X GAA AAUJUGU	ACACAAUUA AAGCGGGG
	1140	AUCGUCAG CUGAUGA X GAA ACAUGCCC	GGGCAUGUA CUGACGAU
	1149	ACUUCCAU CUGAUGA X GAA AUCGUCAG	CUGACGAUU AUGGAAGU
	1150	CACUUCCA CUGAUGA X GAA AAUCGUCA	UGACGAUUUA UGGAAGUG
5	1180	GACAGUGU CUGAUGA X GAA AUUJUCCUG	CAGGAAAUU ACACUGUC
	1181	UGACAGUG CUGAUGA X GAA AAUJUCCU	AGGAAAUUA CACUGUCA
	1188	GUAAGGAU CUGAUGA X GAA ACAGUGUA	UACACUGUC AUCCUUAC
	1191	UUGGUUAAG CUGAUGA X GAA AUGACAGU	ACUGUCAUC CUUACCAA
	1194	GGAUUJGGU CUGAUGA X GAA AGGAUGAC	GUCAUCCUU ACCAAUCC
10	1195	GGGAUJUGG CUGAUGA X GAA AAGGAUGA	UCAUCCUUA CCAAUC
	1201	UGAAAUJGG CUGAUGA X GAA AUUGGUAA	UUACCAAUC CCAUUUCA
	1206	UCCUUJUGA CUGAUGA X GAA AUGGGAUU	AAUCCCAUU UCAAAGGA
	1207	CUCCUUJUG CUGAUGA X GAA AAUGGGAU	AUCCCAUUU CAAAGGAG
	1208	UCUCCUUU CUGAUGA X GAA AAAUGGGA	UCCCAUUJC AAAGGAGA
15	1233	ACCAGAGA CUGAUGA X GAA ACCACAUG	CAUGUGGUC UCUCUGGU
	1235	CAACCAGA CUGAUGA X GAA AGACCACA	UGUGGUCUC UCUGGUUG
	1237	CACAACCA CUGAUGA X GAA AGAGACCA	UGGUCUCUC UGGUUGUG
	1242	ACAUACAC CUGAUGA X GAA ACCAGAGA	UCUCUGGUU GUGUAUGU
	1247	GUGGGACA CUGAUGA X GAA ACACAACC	GGUUGUGUA UGUCCAC
20	1251	UGGGGUGG CUGAUGA X GAA ACAUACAC	GUGUAUGUC CCACCCCA
	1263	UUCUCACC CUGAUGA X GAA AUCUGGGG	CCCCAGAUU GGUGAGAA
	1274	AGAUUJAGA CUGAUGA X GAA AUUUCUCA	UGAGAAAUC UCUAAUCU
	1276	AGAGAUUA CUGAUGA X GAA AGAUUJCU	AGAAAUCUC UAAUCUCU
	1278	GGAGAGAGAU CUGAUGA X GAA AGAGAUUU	AAAUCUCUA AUCUCUCC
25	1281	ACAGGAGA CUGAUGA X GAA AUUAGAGA	UCUCUAAUC UCUCCUGU
	1283	CCACAGGA CUGAUGA X GAA AGAUUJAGA	UCUAAUCUC UCCUGUGG
	1285	AUCCACAG CUGAUGA X GAA AGAGAUUA	UAAUCUCUC CUGUGGAU
	1294	CUGGUAGG CUGAUGA X GAA AUCCACAG	CUGUGGAUU CCUACCAAG
	1295	ACUGGUAG CUGAUGA X GAA AAUCCACA	UGUGGAUUC CUACCAAGU
30	1298	CGUACUGG CUGAUGA X GAA AGGAAUCC	GGAUUCCUA CCAGUACG
	1304	UGGUGCCG CUGAUGA X GAA ACUGGUAG	CUACCAGUA CGGCACCA
	1315	CAGCGUUU CUGAUGA X GAA AGUGGUGC	GCACCACUC AAACGCUG
	1330	AUAGACCG CUGAUGA X GAA ACAUGUCA	UGACAUJUA CGGUCAU

	1335	AUGGCAUA CUGAUGA X GAA ACCGUACA	UGUACGGUC UAUGCCAU
	1337	GAAUGGCA CUGAUGA X GAA AGACCGUA	UACGGUCUA UGCCAUUC
	1344	GGGGGAGG CUGAUGA X GAA AUGGCAUA	UAUGCCAUIU CCUCCCCC
	1345	CGGGGGAG CUGAUGA X GAA AAUGGCAU	AUGCCAUUC CUCCCCCG
5	1348	AUGCGGGG CUGAUGA X GAA AGGAAUGG	CCAUUCCUC CCCCAGCAU
	1357	GUGGAUGU CUGAUGA X GAA AUGCGGGG	CCCCGCAUC ACAUCCAC
	1362	UACCAGUG CUGAUGA X GAA AUGUGAUG	CAUCACAU CACUGGUA
	1370	ACUGCCAA CUGAUGA X GAA ACCAGUGG	CCACUGGUA UUGGCAGU
	1372	CAACUGCC CUGAUGA X GAA AUACCAGU	ACUGGUAUU GGCAGUUG
10	1379	CUUCCUCC CUGAUGA X GAA ACUGCCAA	UUGGCAGUU GGAGGAAG
	1416	GUCACUGA CUGAUGA X GAA ACAGCUUG	CAAGCUGUC UCAGUGAC
	1418	UUGUCACU CUGAUGA X GAA AGACAGCU	AGCUGUCUC AGUGACAA
	1433	CACAAGGG CUGAUGA X GAA AUGGUUU	AAACCCAUA CCCUUGUG
	1438	UUCUUCAC CUGAUGA X GAA AGGGUAUG	CAUACCCUU GUGAAGAA
15	1466	CUCCCUGG CUGAUGA X GAA AGUCCUCC	GGAGGACUU CCAGGGAG
	1467	CCUCCCUUG CUGAUGA X GAA AAGUCCUC	GAGGACUUC CAGGGAGG
	1480	UUCAAUUU CUGAUGA X GAA AUUUCUC	GAGGAAAUA AAAUJGAA
	1485	UUAACUUC CUGAUGA X GAA AUUUJAUU	AAUAAAUAU GAAGUJAA
	1491	UUUUUAUU CUGAUGA X GAA ACUUCAAU	AUUGAAGUU AAUAAAAA
20	1492	AUUUUUUAU CUGAUGA X GAA AACUUCAA	UUGAAGUUA AUAAAAAU
	1495	UUGAUUUU CUGAUGA X GAA AUUAACUU	AAGUAAAUA AAAAUCAA
	1501	AGCAAAUU CUGAUGA X GAA AUUUUJAU	AUAAAAAUU AAUUGCU
	1505	UUAGAGCA CUGAUGA X GAA AUUGAUU	AAAUCAAUU UGCUCUAA
	1506	AUUAGAGC CUGAUGA X GAA AAUUGAUU	AAUCAUUU GCUCUAAU
25	1510	UUCAAUUA CUGAUGA X GAA AGCAAAUU	AAUUUGCUC UAAUJGAA
	1512	CCUUCAAU CUGAUGA X GAA AGAGCAA	UUUGCUCUA AUUGAAGG
	1515	UUUCCUUC CUGAUGA X GAA AUUAGAGC	GCUCUAAUU GAAGGAAA
	1536	AGGGUACU CUGAUGA X GAA ACAGUJUU	AAAACUGUA AGUACCU
	1540	AACAAGGG CUGAUGA X GAA ACUUACAG	CUGUAAGUA CCCUUGUU
30	1545	UGGAUAAAC CUGAUGA X GAA AGGGUACU	AGUACCCUU GUUAUCCA
	1548	GCUUGGAU CUGAUGA X GAA ACAAGGGU	ACCCUUGUU AUCCAAGC
	1549	CGCUUGGA CUGAUGA X GAA AACAAAGGG	CCCUUGUUA UCCAAGCG
	1551	GCCGCUUG CUGAUGA X GAA AUUACAAG	CUUGUUAUC CAAGCGGC

1568	ACAAAGCU CUGAUGA X GAA ACACAUUU	AAAUGUGUC AGCUUJGU
1573	UUUGUACA CUGAUGA X GAA AGCUGACA	UGUCAGCUU UGUACAAA
1574	AUUUGUAC CUGAUGA X GAA AAGCUGAC	GUCAGCIUU GUACAAAU
1577	CACAUUUG CUGAUGA X GAA ACAAAGCU	AGCUUUGUA CAAAUGUG
5	1593 ACUUUGUU CUGAUGA X GAA ACCGCUUC	GAAGCGGUC AACAAAGU
	1602 CCUCUCCC CUGAUGA X GAA ACUUUGUU	AACAAAGUC GGGAGAGG
	1623 UGGAAGGA CUGAUGA X GAA AUCACCCU	AGGGUGAUC UCCUUCCA
	1625 CGUGGAAG CUGAUGA X GAA AGAUCACC	GGUGAUCUC CUUCCACG
	1628 UCACGUGG CUGAUGA X GAA AGGAGAUC	GAUCUCCUU CCACGUGA
10	1629 GUCACGUG CUGAUGA X GAA AAGGAGAU	AUCUCCUUC CACGUGAC
	1645 AAUUCAG CUGAUGA X GAA ACCCCUGG	CCAGGGGUC CUGAAAUU
	1653 UGCAAAGU CUGAUGA X GAA AUUCAGG	CCUGAAAUU ACUUUGCA
	1654 UUGCAAAG CUGAUGA X GAA AAUUCAG	CUGAAAUUA CUUUGCAA
	1657 AGGUUGCA CUGAUGA X GAA AGUAAUJU	AAAUUACUU UGCAACCU
15	1658 CAGGUUGC CUGAUGA X GAA AAGUAAUJU	AAUJACUUU GCAACCUG
	1697 ACCACAAA CUGAUGA X GAA ACACGCUC	GAGCGUGUC UUUGUGGU
	1699 GCACCACA CUGAUGA X GAA AGACACGC	GCGUGUCUU UGUGGUGC
	1700 UGCACCAC CUGAUGA X GAA AAGACACG	CGUGUCUUU GUGGUGCA
	1721 CAAACGUA CUGAUGA X GAA AUCUGUCU	AGACAGAUC UACGUUJG
20	1723 CUAAACG CUGAUGA X GAA AGAUCUGU	ACAGAUCUA CGUUUGAG
	1727 GGUUCUCA CUGAUGA X GAA ACGUAGAU	AUCUACGUU UGAGAACCC
	1728 AGGUUCUC CUGAUGA X GAA AACGUAGA	UCUACGUUU GAGAACCU
	1737 UACCAUGU CUGAUGA X GAA AGGUUCUC	GAGAACUC ACAUGGUA
	1745 CAAGCUUG CUGAUGA X GAA ACCAUGUG	CACAUGGUA CAAGCUUG
25	1752 UGUGGGCC CUGAUGA X GAA AGCUUGUA	UACAAGCUU GGCCCACA
	1765 GAUUGGCA CUGAUGA X GAA AGGCUGUG	CACAGCCUC UGCCAAUC
	1773 CCCACAUG CUGAUGA X GAA AUUGGCAG	CUGCCAAUC CAUGUGGG
	1787 GUGUGGGC CUGAUGA X GAA ACUCUCCC	GGGAGAGUU GCCCACAC
	1800 UUCUUGCA CUGAUGA X GAA ACAGGUGU	ACACCUUU UGCAAGAA
30	1801 GUUCUUGC CUGAUGA X GAA AACAGGUG	CACCUUUU GCAAGAAC
	1811 GAGUAUCC CUGAUGA X GAA AGUUCUUG	CAAGAACUU GGAAUACUC
	1816 CCAAAGAG CUGAUGA X GAA AUCCAAGU	ACUUGGUA CUCUUUGG
	1819 UUUCAAA CUGAUGA X GAA AGUAUCCA	UGGAUACUC UUUGGAAA

1821	AAUUUCCA CUGAUGA X GAA AGAGUAUC	GAUACUCUU UGGAAAUU
1822	CAAUUUCC CUGAUGA X GAA AAGAGUAU	AUACUCUUU GGAAAUUG
1829	UGGCAUUC CUGAUGA X GAA AUUUCCAA	UUGGAAAUU GAAUGCAC
1844	UAUUAGAG CUGAUGA X GAA ACAUGGUG	CACCAUGUU CUCUAAUA
5	1845 CUAAUAGA CUGAUGA X GAA AACAUUGGU	ACCAUGUUC UCUAAUAG
1847	UGCUAUUA CUGAUGA X GAA AGAACAU	CAUGUUCUC UAAUAGCA
1849	UGUGCUAU CUGAUGA X GAA AGAGAAC	UGUUCUCUA AUAGCACA
1852	AUJUGUGC CUGAUGA X GAA AUUAGAGA	UCUCUAAUA GCACAAAU
1866	AUGAUCAA CUGAUGA X GAA AUGUCAUU	AAUGACAUU UUGAUCAU
10	1867 CAUGAUCA CUGAUGA X GAA AAUGUCAU	AUGACAUUU UGAUCAUG
1868	CCAUGAUC CUGAUGA X GAA AAAUGUCA	UGACAUUUU GAUCAUGG
1872	AGCUCCAU CUGAUGA X GAA AUCAAAAU	AUUUJUGAUC AUGGAGCU
1881	GCAUUCUU CUGAUGA X GAA AGCUCCAU	AUGGAGCUU AAGAAUGC
1882	UGCAUJUC CUGAUGA X GAA AAGCUCCA	UGGAGCUUA AGAAUGCA
15	1892 CCUGCAAG CUGAUGA X GAA AUGCAUUC	GAAUGCAUC CUUGCAGG
1895	GGUCCUGC CUGAUGA X GAA AGGAUGCA	UGCAUCCUU GCAGGACC
1913	GGCAGACA CUGAUGA X GAA AGUCUCCU	AGGAGACUA UGUCUGCC
1917	GCAAGGC A CUGAUGA X GAA ACAUAGUC	GACUAUGUC UGCCUUGC
1923	UCUUGAGC CUGAUGA X GAA AGGCAGAC	GUCUGCCUU GCUCAAGA
20	1927 CCUGUCUU CUGAUGA X GAA AGCAAGGC	GCCUUGCUC AAGACAGG
1954	GACCACGC CUGAUGA X GAA AUGUCUUU	AAAGACAUU GCGUGGUC
1962	AGCUGGCCU CUGAUGA X GAA ACCACGCA	UGCGUGGUC AGGCAGCU
1971	AGGACUGU CUGAUGA X GAA AGCUGCCU	AGGCAGCUC ACAGUCCU
1977	CGCUCUAG CUGAUGA X GAA ACUGUGAG	CUCACAGUC CUAGAGCG
25	1980 ACACGCUC CUGAUGA X GAA AGGACUGU	ACAGUCCUA GAGCGUGU
2001	UUUCCUGU CUGAUGA X GAA AUCGUGGG	CCCACGAUC ACAGGAAA
2020	UGUCGUCU CUGAUGA X GAA AUUCUCCA	UGGAGAAUC AGACGACA
2032	UUCCCCAA CUGAUGA X GAA ACUUGUCG	CGACAAGUA UGGGGAA
2034	CUUJCCCC CUGAUGA X GAA AUACUUGU	ACAAGUAUU GGGAAAG
30	2046 GAGACUUC CUGAUGA X GAA AUGCUUUC	GAAAGCAUC GAAGUCUC
2052	GUGCAUGA CUGAUGA X GAA ACUUCGAU	AUCGAAGUC UCAUGCAC
2054	CCGUGCAU CUGAUGA X GAA AGACUUCG	CGAAGUCUC AUGCACGG
2066	GAUUCCCA CUGAUGA X GAA AUGCCGUG	CACGGCAUC UGGAAUC

	2074	UGGAGGGG CUGAUGA X GAA AUUCCAG	CUGGGAAUC CCCCUCCA
	2080	GAUCUGUG CUGAUGA X GAA AGGGGGAU	AUCCCCCUC CACAGAUC
	2088	AACCACAU CUGAUGA X GAA AUCUGUGG	CCACAGAUC AUGUGGUU
	2096	UAUCUUUA CUGAUGA X GAA ACCACAUG	CAUGUGGUU UAAAGAUA
5	2097	UUAUCUUU CUGAUGA X GAA AACCAAU	AUGUGGUU AAAGAUAA
	2098	AUUAUCUU CUGAUGA X GAA AAACCACA	UGUGGUUUA AAGAUAAU
	2104	GGUCUCAU CUGAUGA X GAA AUCUUAAA	UAAAAGAUA AUGAGACC
	2115	UCUUCUAC CUGAUGA X GAA AGGGUCUC	GAGACCCUU GUAGAAGA
	2118	GAGUCUUC CUGAUGA X GAA ACAAGGGU	ACCCUUGUA GAAGACUC
10	2126	CAAUGCCU CUGAUGA X GAA AGUCUUCU	AGAAGACUC AGGCAUUG
	2133	UUCAAUAC CUGAUGA X GAA AUGCCUGA	UCAGGCAUU GUAUUGAA
	2136	UCCUUCAA CUGAUGA X GAA ACAAUGC	GGCAUJUGUA UUGAAGGA
	2138	CAUCCUUC CUGAUGA X GAA AUACAAUG	CAUUGUAUU GAAGGAUG
	2160	CGGAUAGU CUGAUGA X GAA AGGUUCCG	CGGAACCUC ACUAUCCG
15	2164	UCUGCGGA CUGAUGA X GAA AGUGAGGU	ACCUCACUA UCCGCAGA
	2166	ACUCUGCG CUGAUGA X GAA AUAGUGAG	CUCACUAUC CGCAGAGU
	2196	CAGGUGUA CUGAUGA X GAA AGGCCUUC	GAAGGCCUC UACACCUG
	2198	GGCAGGUG CUGAUGA X GAA AGAGGCCU	AGGCCUCUA CACCUGCC
	2220	CAGCCAAG CUGAUGA X GAA ACACUGCA	UGCAGUGUU CUUGGCUG
20	2221	ACAGCCAA CUGAUGA X GAA AACACUGC	GCAGUGUUC UUGGCUGU
	2223	GCACAGCC CUGAUGA X GAA AGAACACU	AGUGUUCUU GGCUGUGC
	2246	UUUAUGAAA CUGAUGA X GAA AUGCCUCC	GGAGGCAUUU UUUCAUAA
	2247	AUUAUGAA CUGAUGA X GAA AAUGCCUC	GAGGCAUUU UUCAUAAU
	2248	UAUUAUGA CUGAUGA X GAA AAAUGCCU	AGGCAUUUU UCAUAAUA
25	2249	CUAUUAUG CUGAUGA X GAA AAAAUGCC	GGCAUUUUU CAUAAUAG
	2250	UCUAUUUAU CUGAUGA X GAA AAAAUGC	GCAUUUUUC AUAAUAGA
	2253	CCUUCUAU CUGAUGA X GAA AUGAAAAA	UUUUUCAUA AUAGAAGG
	2256	GCACCUUC CUGAUGA X GAA AUUAUGAA	UUCAUAAUA GAAGGUGC
	2282	UGAUUUCC CUGAUGA X GAA AGUUCGUC	GACGAACUU GGAAAUCA
30	2289	AGAAUAAU CUGAUGA X GAA AUUUCCAA	UUGGAAUUC AUUAUUCU
	2292	ACUAGAAU CUGAUGA X GAA AUGAUUUC	GAAAUCAUU AUUCUAGU
	2293	UACUAGAA CUGAUGA X GAA AAUGAUUU	AAAUCAUUA UUCUAGUA
	2295	CCUACUAG CUGAUGA X GAA AUAAUGAU	AUCAUUAUU CUAGUAGG

	2296	GCCUACUA CUGAUGA X GAA AAUAAAUA	UCAUUAUUC UAGUAGGC
	2298	GUGCCUAC CUGAUGA X GAA AGAAUAAA	AUUAUUCUA GUAGGCAC
	2301	GUCGUGCC CUGAUGA X GAA ACUAGAAU	AUUCUAGUA GGCACCGAC
	2316	AACAUGGC CUGAUGA X GAA AUCACCGU	ACGGUGAUU GCCAUGUU
5	2324	GCCAGAAAG CUGAUGA X GAA ACAUGGCA	UGCAGAUU CUUCUGGC
	2325	AGCCAGAA CUGAUGA X GAA AACAUAGC	GCCAUGUUC UUCUGGCU
	2327	GUAGCCAG CUGAUGA X GAA AGAACAU	CAUGUUCUU CUGGCUAC
	2328	AGUAGCCA CUGAUGA X GAA AAGAACAU	AUGUUCUUC UGGCUACU
	2334	ACAAGAAAG CUGAUGA X GAA AGCCAGAA	UUCUGGCUA CUUCUUGU
10	2337	AUGACAAG CUGAUGA X GAA AGUAGCCA	UGGCUACUU CUUGUCAU
	2338	GAUGACAA CUGAUGA X GAA AAGUAGCC	GGCUACUUC UUGUCAUC
	2340	AUGAUGAC CUGAUGA X GAA AGAAGUAG	CUACUUCUU GUCAUCAU
	2343	AGGAUGAU CUGAUGA X GAA ACAAGAAAG	CUUCUUGUC AUCAUCCU
	2346	CCUAGGAU CUGAUGA X GAA AUGACAAG	CUUGUCAUC AUCCUAGG
15	2349	GUCCCCUAG CUGAUGA X GAA AUGAUGAC	GUCAUCAUC CUAGGGAC
	2352	ACGGGUCCC CUGAUGA X GAA AGGAUGAU	AUCAUCCUA GGGACCGU
	2361	GCCCCGUU CUGAUGA X GAA ACGGUCCC	GGGACCGUU AAGCGGGC
	2362	GGCCCCGU CUGAUGA X GAA AACGGUCC	GGACCGUUA AGCGGGCC
	2396	UGGACAAG CUGAUGA X GAA AGCCUGUC	GACAGGCUA CUUGUCCA
20	2399	CGAUGGAC CUGAUGA X GAA AGUAGCCU	AGGCUACUU GUCCAUHG
	2402	UGACGAUG CUGAUGA X GAA ACAAGUAG	CUACUUGUC CAUCGUCA
	2406	UCCAUGAC CUGAUGA X GAA AUGGACAA	UUGUCCAUC GUCAUGGA
	2409	GGAUCCAU CUGAUGA X GAA ACGAUGGA	UCCAUCGUC AUGGAUCC
	2416	UUCAUCUG CUGAUGA X GAA AUCCAUGA	UCAUGGAUC CAGAUGAA
25	2427	UCCAAUUGG CUGAUGA X GAA AGUUCAUC	GAUGAACUC CCAUUGGA
	2432	GUUCAUCC CUGAUGA X GAA AUGGGAGU	ACUCCCAUU GGAUGAAC
	2443	UCGUUUCAC CUGAUGA X GAA AUGUUCAU	AUGAACAUU GUGAACGA
	2458	GGCAUCAU CUGAUGA X GAA AGGCAGUC	GACUGCCUU AUGAUGCC
	2459	UGGCAUCA CUGAUGA X GAA AAGGCAGU	ACUGCCUUUA UGAUGCCA
30	2480	CUCUGGGG CUGAUGA X GAA AUUCCAU	AUGGGAAUU CCCCAGAG
	2481	UCUCUGGG CUGAUGA X GAA AAUUCCCA	UGGGAAUUC CCCAGAGA
	2502	GGCUUACC CUGAUGA X GAA AGGUUCAG	CUGAACCUA GGUAAGCC
	2506	AAGAGGCCU CUGAUGA X GAA ACCUAGGU	ACCUAGGUA AGCCUCUU

2512	ACGGCCAA CUGAUGA X GAA AGGCUUAC	GUAAGCCUC UUGGCCGU
2514	CCACGGCC CUGAUGA X GAA AGAGGCUU	AAGCCUCUU GGCCGUGG
2528	CUUGGCCA CUGAUGA X GAA AGGCACCA	UGGUGCCUU UGGCCAAG
2529	UCUUGGCC CUGAUGA X GAA AAGGCACC	GGUGCCUUU GGCCAAGA
5	2541 UCUGCUUC CUGAUGA X GAA AUCUCUUG	CAAGAGAUU GAAGCAGA
	2555 CAAUUCCA CUGAUGA X GAA AGGCAUCU	AGAUGCCUU UGGAAUUG
	2556 UCAAUUCC CUGAUGA X GAA AAGGCAUC	GAUGCCUUU GGAAUUGA
	2562 GUCUUGUC CUGAUGA X GAA AUUCCAAA	UUUGGAAUU GACAAGAC
	2578 UGUCCUGC CUGAUGA X GAA AGUUGCUG	CAGCAACUU GCAGGACA
10	2589 UUGACUGC CUGAUGA X GAA ACUGUCCU	AGGACAGUA GCAGUCAA
	2595 AACAUUUU CUGAUGA X GAA ACUGCUAC	GUAGCAGUC AAAAUGUU
	2603 CUUCUUUC CUGAUGA X GAA ACAUUUUG	CAAA AUGUU GAAAGAAG
	2632 GAGAGCUC CUGAUGA X GAA AUGCUCAC	GUGAGCAUC GAGCUCUC
	2638 AGACAUUGA CUGAUGA X GAA AGCUCGAU	AUCGAGCUC UCAUGUCU
15	2640 UCAGACAU CUGAUGA X GAA AGAGCUCG	CGAGCUCUC AUGUCUGA
	2645 UGAGUUCA CUGAUGA X GAA ACAUGAGA	UCUCAUGUC UGAACUCA
	2652 AGGAUCUU CUGAUGA X GAA AGUUCAGA	UCUGAACUC AAGAUCCU
	2658 UGAAUAGAG CUGAUGA X GAA AUCUUGAG	CUCAAGAUUC CUCAUUCA
	2661 AUAAUGAAU CUGAUGA X GAA AGGAUCUU	AAGAUCCUC AUUCAUAU
20	2664 CCAAAUAG CUGAUGA X GAA AUGAGGAU	AUCCUCAUU CAUAIJUGG
	2665 ACCAAUAU CUGAUGA X GAA AAUGAGGA	UCCUCAUUC AUUJUGGU
	2668 GUGACCAA CUGAUGA X GAA AUGAAUGA	UCAUUCAUA UUGGUCAC
	2670 UGGUGACC CUGAUGA X GAA AUAAUGAAU	AUUCAUUU GGUCACCA
	2674 GAGAUGGU CUGAUGA X GAA ACCAAUAU	AUAAUGGUUC ACCAUCUC
25	2680 CACAUUGA CUGAUGA X GAA AUGGUGAC	GUCACCAUC UCAAUGUG
	2682 ACCACAUU CUGAUGA X GAA AGAUGGUG	CACCAUCUC AAUGUGGU
	2691 AGAAGGUU CUGAUGA X GAA ACCACAUU	AAUGUGGUUC AACCUUCU
	2697 GCACCUAG CUGAUGA X GAA AGGUUGAC	GUCAACCUU CUAGGUGC
	2698 GGCACCUA CUGAUGA X GAA AAGGUUGA	UCAACCUUC UAGGUGCC
30	2700 CAGGCACC CUGAUGA X GAA AGAAGGUU	AACCUUCUA GGUGCCUG
	2710 UGGCUUUGG CUGAUGA X GAA ACAGGCAC	GUGCCUGUA CCAAGCCA
	2730 AUCACCAU CUGAUGA X GAA AGUGGCC	GGGCCACTUC AUGGUGAU
	2739 AAUUCCAC CUGAUGA X GAA AUCACCAU	AUGGUGAUU GUGGAAUU

2747	AUUUGCAG CUGAUGA X GAA AUUCCACA	UGUGGAAUU CUGCAAAU
2748	AAUUUGCA CUGAUGA X GAA AAUUCAC	GUGGAAUUC UGCAAAAU
2756	GGUUUCCA CUGAUGA X GAA AAUJGCAG	CUGCAAAUJ UGGAAACC
2757	AGGUUUCC CUGAUGA X GAA AAUUUGCA	UGCAAAUU GGAAACCU
5	2768 GGUAAGUG CUGAUGA X GAA ACAGGUU	AAACCUGUC CACUUACC
2773	CCUCAGGU CUGAUGA X GAA AGUGGACA	UGUCCACUU ACCUGAGG
2774	UCCUCAGG CUGAUGA X GAA AAGUGGAC	GUCCACUUA CCUGAGGA
2798	AGGGGACA CUGAUGA X GAA AAUCAUU	AAAUGAAUU UGUCCCCU
2799	UAGGGGAC CUGAUGA X GAA AAUCAUU	AAUGAAUU GUCCCCUA
10	2802 UUGUAGGG CUGAUGA X GAA ACAAAUJC	GAAUUUUGUC CCCUACAA
2807	UGGUUCUUG CUGAUGA X GAA AGGGGACA	UGUCCCCUA CAAGACCA
2828	CUUGACGG CUGAUGA X GAA AUCGUGCC	GGCACGAUU CCGUCAAG
2829	CCUUGACG CUGAUGA X GAA AAUCGUGC	GCACGAUUC CGUCAAGG
2833	UUUCCUU CUGAUGA X GAA ACGGAAUC	GAUUCCGUC AAGGGAAA
15	2846 CUCCAACG CUGAUGA X GAA AGUCUUJC	GAAAGACUA CGUUGGAG
2850	AUUGCUC CUGAUGA X GAA ACGUAGUC	GACUACGUU GGAGCAAU
2859	UCCACAGG CUGAUGA X GAA AAUJCUCC	GGAGCAAUC CCUGUGGA
2869	CCGUUUCA CUGAUGA X GAA AUCCACAG	CUGUGGAUC UGAAACGG
2882	UGCUGUCC CUGAUGA X GAA AGCGCCGU	ACGGCGCUU GGACAGCA
20	2892 CUACUGGU CUGAUGA X GAA AUGCUGUC	GACAGCAUC ACCAGUAG
2899	GCUCUGGC CUGAUGA X GAA ACUGGUGA	UCACCAGUA GCCAGAGC
2909	AGCUGGGCU CUGAUGA X GAA AGCUCUGG	CCAGAGCUC AGCCAGCU
2918	CAAAUCCA CUGAUGA X GAA AGCUGGCCU	AGCCAGCUC UGGAUUUG
2924	CCUCCACA CUGAUGA X GAA AUCCAGAG	CUCUGGAUU UGUGGAGG
25	2925 UCCUCCAC CUGAUGA X GAA AAUCCAGA	UCUGGAUUU GUUGGAGGA
2939	CACUGAGG CUGAUGA X GAA ACUUCUCC	GGAGAAGUC CCUCAGUG
2943	ACAUCACU CUGAUGA X GAA AGGGACUU	AAGUCCCUC AGUGAUGU
2952	UCUUCUUC CUGAUGA X GAA ACAUCACU	AGUGAUGUA GAAGAAGA
2968	AUCUUCAG CUGAUGA X GAA AGCUUCCU	AGGAAGCUC CUGAAGAU
30	2977 CUUAUACA CUGAUGA X GAA AUCUUCAG	CUGAAGAUC UGUUAAG
2981	AGUCCUUA CUGAUGA X GAA ACAGAUCU	AGAUCUGUA UAAGGACU
2983	GAAGUCCU CUGAUGA X GAA AUACAGAU	AUCUGUAUA AGGACUUC
2990	AGGUCAGG CUGAUGA X GAA AGUCCUUA	UAAGGACUU CCUGACCU

2991	AAGGUCAG CUGAUGA X GAA AAGUCCUU	AAGGACUUC CUGACCUU
2999	GAUGCUCC CUGAUGA X GAA AGGUCAGG	CCUGACCUU GGAGCAUC
3007	ACAGAUGA CUGAUGA X GAA AUGCUCCA	UGGAGCAUC UCAUCUGU
3009	UAACAGAU CUGAUGA X GAA AGAUGCUC	GAGCAUCUC AUCUGUUA
5	3012 CUGUAACA CUGAUGA X GAA AUGAGAUG	CAUCUCAUC UGUUACAG
	3016 GAAGCUGU CUGAUGA X GAA ACAGAUGA	UCAUCUGUU ACAGCUUC
	3017 GGAAGCUG CUGAUGA X GAA AACAGAUG	CAUCUGUUA CAGCUUCC
	3023 CCACUUGG CUGAUGA X GAA AGCUGUAA	UUACAGCUU CCAAGUGG
	3024 GCCACUUG CUGAUGA X GAA AAGCUGUA	UACAGCUUC CAAGUGGC
10	3034 CAUGCCU CUGAUGA X GAA AGCCACUU	AAGUGGCUA AGGGCAUG
	3047 AUGCCAAG CUGAUGA X GAA ACUCCAUG	CAUGGAGUU CUUGGCAU
	3048 GAUGCCAA CUGAUGA X GAA AACUCCAU	AUGGAGUUC UUGGCAUC
	3050 GCGAUGCC CUGAUGA X GAA AGAACUCC	GGAGUUCUU GGCAUCGC
	3056 ACUUUCGC CUGAUGA X GAA AUGCCAAG	CUUGGCAUC GCGAAAGU
15	3067 CCUGUGGA CUGAUGA X GAA ACACUUUC	GAAAGUGUA UCCACAGG
	3069 UCCCUGUG CUGAUGA X GAA AUACACUU	AAGUGUAUC CACAGGGA
	3094 UAAGAGGA CUGAUGA X GAA AUUUCGUG	CACGAAAUA UCCUCUUA
	3096 GAUAAGAG CUGAUGA X GAA AUAUUUCG	CGAAAAUAUC CUCUUAUC
	3099 UCCGAUAA CUGAUGA X GAA AGGAUAUU	AAUAUCCUC UUAUCGGA
20	3101 UCUCCGAU CUGAUGA X GAA AGAGGAUA	UAUCCUCUU AUCGGAGA
	3102 UUCUCCGA CUGAUGA X GAA AAGAGGAU	AUCCUCUUA UC GGAGAA
	3104 UCUUCUCC CUGAUGA X GAA AUAAGAGG	CCUCUUAUC GGAGAAGA
	3120 CAGAUUUU CUGAUGA X GAA ACCACGUU	AACGUGGUU AAAUCUG
	3121 ACAGAUUU CUGAUGA X GAA AACCACGU	ACGUGGUUA AAAUCUGU
25	3126 AAGUCACA CUGAUGA X GAA AUUUUAAC	GUAAAAAUC UGUGACUU
	3134 CCAAGCCA CUGAUGA X GAA AGUCACAG	CUGUGACUU UGGCUUGG
	3135 GCCAAGCC CUGAUGA X GAA AAGUCACA	UGUGACUUU GGCUJGGC
	3140 CCCGGGCC CUGAUGA X GAA AGCCAAAG	CUUUGGCUU GGCCCAGG
	3151 UUUAUAAA CUGAUGA X GAA AUCCCCGG	CCCGGGAUUA UUUAUAAA
30	3153 UCUUUAAA CUGAUGA X GAA AUAUCCCG	CGGGAUAUU UAUAAAAGA
	3154 AUCUUUAU CUGAUGA X GAA AAUAUCC	GGGAUAUUU AUAAAGAU
	3155 GAUCUUUA CUGAUGA X GAA AAAUAUCC	GGAUAUUUUA UAAAGAUC
	3157 UGGAUCUU CUGAUGA X GAA AUAAAUAU	AUAUUUUA AAGAUCCA

	3163	AUAAUCUG CUGAUGA X GAA AUCUUUAU	AUAAAGAUC CAGAUUAU
	3169	UCUGACAU CUGAUGA X GAA AUCUGGAU	AUCCAGAUU AUGUCAGA
	3170	UUCUGACA CUGAUGA X GAA AAUCUGGA	UCCAGAUUA UGUCAAGAA
	3174	CCUUUJCU CUGAUGA X GAA ACAUAAUC	GAUUAUGUC AGAAAAGG
5	3190	AGGGAGGC CUGAUGA X GAA AGCAUCUC	GAGAUGCUC GCCUCCU
	3195	UUCAAAGG CUGAUGA X GAA AGGGGAGC	GCUCGCCUC CCUUUGAA
	3199	CCAUUUCA CUGAUGA X GAA AGGGAGGC	GCCUCCCUU UGAAAUGG
	3200	UCCAUUUC CUGAUGA X GAA AAGGGAGG	CCUCCCCUU GAAAUGGA
	3225	CUGUCAAA CUGAUGA X GAA AUJGUUUC	GAAACAAUU UUJGACAG
10	3226	UCUGUCAA CUGAUGA X GAA AAUUGUUU	AAACAAUJJU UUGACAGA
	3227	CUCUGUCA CUGAUGA X GAA AAAUJGUU	AAACAAUJJU UGACAGAG
	3228	ACUCUGUC CUGAUGA X GAA AAAAUUGU	ACAAUUUUU GACAGAGU
	3239	GGAUUGUG CUGAUGA X GAA ACACUCUG	CAGAGUGUA CACAAUCC
	3246	UCACUCUG CUGAUGA X GAA AUJGUGUA	UACACAAUC CAGAGUGA
15	3258	AAAGACCA CUGAUGA X GAA ACGUCACU	AGUGACGUC UGGUCUUU
	3263	CACCAAAA CUGAUGA X GAA ACCAGACG	CGUCUGGUC UUUJGGUG
	3265	AACACCAA CUGAUGA X GAA AGACCAGA	UCUGGUCUU UGGUGUU
	3266	AAACACCA CUGAUGA X GAA AAGACCAG	CUGGUCUUU UGGUGUUU
	3267	AAAACACC CUGAUGA X GAA AAAGACCA	UGGUCUUUU GGUGUUUU
20	3273	CACAGCAA CUGAUGA X GAA ACACCAA	UUJGGUGUU UUGCUGUG
	3274	CCACAGCA CUGAUGA X GAA AACACCAA	UJGGUGUUU UGCUCUGG
	3275	CCCACAGC CUGAUGA X GAA AAACACCA	UGGUGUUUU GCUGUGGG
	3288	AAGGAAAA CUGAUGA X GAA AUJUCCCA	UGGGAAAUA UUUUCCUU
	3290	CUAAGGAA CUGAUGA X GAA AUJUUUCC	GGAAAUAUU UUCCUUAG
25	3291	CCUAAGGA CUGAUGA X GAA AAUAUUUC	GAAAUAJJU UCCUUAGG
	3292	ACCUAAGG CUGAUGA X GAA AAAUAUU	AAAUAUUUU CCUUAGGU
	3293	CACCUAAG CUGAUGA X GAA AAAAUUU	AAUAUUUUC CUUAGGUG
	3296	AAGCACCU CUGAUGA X GAA AGGAAAAU	AUUUUCUU AGGUGCUU
	3297	GAAGCACC CUGAUGA X GAA AAGGAAAA	UUUUCUUUA GGUGCUUC
30	3304	AUAUGGAG CUGAUGA X GAA AGCACCUA	UAGGUGCUU CUCCAUAU
	3305	GAUAUJGG CUGAUGA X GAA AAGCACCU	AGGUGCUUC UCCAUAUC
	3307	AGGAUUAUG CUGAUGA X GAA AGAACAC	GUGCUUCUC CAUAUCCU
	3311	CCCCAGGA CUGAUGA X GAA AUGGAGAA	UUCUCCAUA UCCUGGGG

	3313	UACCCCAAG CUGAUGA X GAA AUAUGGAG	CUCCAUUAUC CUGGGGUUA
	3321	UCAAUCUU CUGAUGA X GAA ACCCCAGG	CCUGGGGUUA AAGAUUGA
	3327	UCUUCAUC CUGAUGA X GAA AUCUUUAC	GUAAAAGAUU GAUGAAGA
	3338	GCCUACAA CUGAUGA X GAA AUUCUUCA	UGAAGAAUU UUGUAGGC
5	3339	CGCCUACA CUGAUGA X GAA AAUUCUUC	GAAGAAUUU UGUAGGCG
	3340	UCGCCUAC CUGAUGA X GAA AAAUUCUU	AAGAAUUUU GUAGGCGA
	3343	CAAUCGCC CUGAUGA X GAA ACAAAAUU	AAUUUUGUA GGCGAUUG
	3350	CUUCUUUC CUGAUGA X GAA AUCGCCUA	UAGGCGAUU GAAAGAAG
	3364	CCUCAUUC CUGAUGA X GAA AGUUCUU	AAGGAACUA GAAUGAGG
10	3382	UGUAGUAU CUGAUGA X GAA AUCAGGGG	CCCCUGAUU AUACUACA
	3383	GUGUAGUA CUGAUGA X GAA AAUCAGGG	CCCUGAUUA UACUACAC
	3385	UGGUGUAG CUGAUGA X GAA AUAAUCAG	CUGAUUAUA CUACACCA
	3388	UUCUGGUG CUGAUGA X GAA AGUAAUAAU	AUUUAUACUA CACCAGAA
	3401	UGGUCUGG CUGAUGA X GAA ACAUUUCU	AGAAAUGUA CCAGACCA
15	3439	GGGUCUCU CUGAUGA X GAA ACUGGGCU	AGCCCAGUC AGAGACCC
	3452	ACUCUGAA CUGAUGA X GAA ACGUGGGU	ACCCACGUU UUCAGAGU
	3453	AACUCUGA CUGAUGA X GAA AACGUGGG	CCCACGUUU UCAGAGUU
	3454	CAACUCUG CUGAUGA X GAA AAACGUGG	CCACGUUUU CAGAGUUG
	3455	CCAACUCU CUGAUGA X GAA AAAACGUG	CACGUUUUC AGAGUUGG
20	3461	GUUCCACC CUGAUGA X GAA ACUCUGAA	UUCAGAGUU GGUGGAAC
	3472	AUUUCCCA CUGAUGA X GAA AUGUUCCA	UGGAACAUU UGGGAAAU
	3473	GAUUUCCC CUGAUGA X GAA AAUGUUCC	GGAACAUUU GGGAAAUC
	3481	UUGCAAGA CUGAUGA X GAA AUUCCCA	UGGGAAAUC UCUUGCAA
	3483	GCUUGCAA CUGAUGA X GAA AGAUUUCC	GGAAAUCUC UUGCAAGC
25	3485	UAGCUUJGC CUGAUGA X GAA AGAGAUUU	AAAUCUCUU GCAAGCUA
	3493	CUGAGCAU CUGAUGA X GAA AGCUUGCA	UGCAAGCUA AUGCUCAG
	3499	AUCCUGCU CUGAUGA X GAA AGCAUUAG	CUAAUGCUC AGCAGGAU
	3518	GAACAAUG CUGAUGA X GAA AGUCUUUG	CAAAGACUA CAJUGUUC
	3522	GGAAGAAC CUGAUGA X GAA AUGUAGUC	GACUACAUU GUUCUUCC
30	3525	AUCGGAAG CUGAUGA X GAA ACAAUUGA	UACAUUGUU CUUCCGAU
	3526	UAUCGGAA CUGAUGA X GAA AACAAUGU	ACAUUGUUC UUCCGAUA
	3528	GAUAUCGG CUGAUGA X GAA AGAACAAU	AUUGUUCUU CCGAUUAUC
	3529	UGAUUAUCG CUGAUGA X GAA AAGAACAA	UUGUUCUUUC CGAUUAUC

	3534	GUCUCUGA CUGAUGA X GAA AUCGGAAG	CUUCCGAUA UCAGAGAC
	3536	AAGUCUCU CUGAUGA X GAA AUAUCCGA	UCCGAUAUC AGAGACUU
	3544	CAUGCUCU CUGAUGA X GAA AGUCUCUG	CAGAGACUU UGAGCAUG
	3545	CCAUGCUC CUGAUGA X GAA AAGUCUCU	AGAGACUUU GAGCAUGG
5	3562	GAGUCCAG CUGAUGA X GAA AUCCUCUU	AAGAGGAUU CUGGACUC
	3563	AGAGUCCA CUGAUGA X GAA AAUCCUCU	AGAGGAUUC UGGACUCU
	3570	GGCAGAGA CUGAUGA X GAA AGUCCAGA	UCUGGACUC UCUCUGCC
	3572	UAGGCAGA CUGAUGA X GAA AGAGUCCA	UGGACUCUC UCUGCCUA
	3574	GGUAGGCA CUGAUGA X GAA AGAGAGUC	GACUCUCUC UGCCUACC
10	3580	AGGUGAGG CUGAUGA X GAA AGGCAGAG	CUCUGCCUA CCUCACCU
	3584	AAACAGGU CUGAUGA X GAA AGGUAGGC	GCCUACCUC ACCUGUUU
	3591	AUACAGGA CUGAUGA X GAA ACAGGUGA	UCACCUGUU UCCUGUAU
	3592	CAUACAGG CUGAUGA X GAA AACAGGUG	CACCUGUUU CCUGUAUG
	3593	CCAUACAG CUGAUGA X GAA AAACAGGU	ACCUGUUUC CUGUAUGG
15	3598	CUCCUCCA CUGAUGA X GAA ACAGGAAA	UUUCCUGUA UGGAGGAG
	3615	GGGUCACA CUGAUGA X GAA ACUUCCUC	GAGGAAGUA UGUGACCC
	3629	CAUAAUUGG CUGAUGA X GAA AUUUGGGG	CCCCAAAUU CCAUUAUG
	3630	UCAUAAUG CUGAUGA X GAA AAUUUGGG	CCCAAAUUC CAUUAUGA
	3634	GUUGUCAU CUGAUGA X GAA AUGGAAU	AAUUCCAUU AUGACAAC
20	3635	UGUUGUCA CUGAUGA X GAA AAUGGAAU	AUUCCAUUA UGACAACA
	3654	UACUGACU CUGAUGA X GAA AUUCCUGC	GCAGGAAUC AGUCAGUA
	3658	CAGAUACU CUGAUGA X GAA ACUGAUUC	GAAUCAGUC AGUAUCUG
	3662	UCUGCAGA CUGAUGA X GAA ACUGACUG	CAGUCAGUA UCUGCAGA
	3664	GUUCUGCA CUGAUGA X GAA AUACUGAC	GUCAGUAUC UGCAGAAC
25	3676	CUUUCGCU CUGAUGA X GAA ACUGUUCU	AGAACAGUA AGCGAAAG
	3702	AAUGUUUU CUGAUGA X GAA ACACUCAC	GUGAGUGUA AAAACAUU
	3710	UAUCUUCA CUGAUGA X GAA AUGUUUUU	AAAAACAUU UGAAGAUUA
	3711	AUAUCUUC CUGAUGA X GAA AAUGUUUU	AAAACAUU GAAGAUAU
	3718	UAACGGGA CUGAUGA X GAA AUCUUCAA	UUGAAGAUUA UCCCGUUA
30	3720	UCUAACGG CUGAUGA X GAA AUAUCUUC	GAAGAUUAUC CCGUUAGA
	3725	GUUCUUCU CUGAUGA X GAA ACGGGAUA	UAUCCCGUU AGAAGAAC
	3726	GGUUCUUC CUGAUGA X GAA AACGGGAU	AUCCCGUUA GAAGAACCC
	3741	AUUACUUU CUGAUGA X GAA ACUUCUGG	CCAGAAGUA AAAGUAAU

3747	UCUGGGAU CUGAUGA X GAA ACUUUUAC	GUAAAAGUA AUCCCAGA
3750	UCAUCUGG CUGAUGA X GAA AUUACUU	AAAGUAAUC CCAGAUGA
3778	AAGAACCA CUGAUGA X GAA ACCACUGU	ACAGUGGUA UGGUUCUU
3783	GAGGCAAG CUGAUGA X GAA ACCAUACC	GGUAUGGUU CUUGCCUC
5	3784 UGAGGCAG CUGAUGA X GAA AACCAUAC	GUAUUGGUJC UUGCCUCA
3786	UCUGAGGC CUGAUGA X GAA AGAACCAU	AUGGUUCUU GCCUCAGA
3791	GCUCUUCU CUGAUGA X GAA AGGCAAGA	UCUUGCCUC AGAAGAGC
3808	GUCUUCCA CUGAUGA X GAA AGUUUUCA	UGAAAACUU UGGAAGAC
3809	UGUCUUCC CUGAUGA X GAA AAGUUUUC	GAAAACUUU GGAAGACA
10	3827 AUGGAGAU CUGAUGA X GAA AUUUGGUU	AACCAAAUU AUCUCCAU
3828	GAUGGAGA CUGAUGA X GAA AAUUUGGU	ACCAAAUUA UCUCCAUC
3830	AAGAUGGA CUGAUGA X GAA AUAAUUUG	CAAAUUAUC UCCAUCUU
3832	AAAAGAUG CUGAUGA X GAA AGAUAAUU	AAUUAUCUC CAUCUUU
3836	CACCAAAA CUGAUGA X GAA AUGGAGAU	AUCUCCAUC UUUUGGUG
15	3838 UCCACCAA CUGAUGA X GAA AGAUGGAG	CUCCAUCUU UUGGUGGA
3839	UUCCACCA CUGAUGA X GAA AAGAUGGA	UCCAUCUUU UGGUGGAA
3840	AUUCCACC CUGAUGA X GAA AAAGAUGG	CCAUCUUU GGUGGAAU
3872	AUGCCACA CUGAUGA X GAA ACUCCUG	CAGGGAGUC UGUGGCAU
3881	AGCCUUCA CUGAUGA X GAA AUGCCACA	UGUGGCAUC UGAAGGCU
20	3890 UCUGGUUU CUGAUGA X GAA AGCCUUC	UGAAGGCUC AAACCAGA
3908	CGGACUGG CUGAUGA X GAA AGCCGCUU	AAGCGGCUA CCAGUCCG
3914	GAUAUCCG CUGAUGA X GAA ACUGGUAG	CUACCAGUC CGGAUAUC
3920	CGGAGUGA CUGAUGA X GAA AUCCGGAC	GUCCGGUA UCACUCCG
3922	AUCGGAGU CUGAUGA X GAA AUAUCCGG	CCGGAUUAUC ACUCCGAU
25	3926 UGUCAUCG CUGAUGA X GAA AGUGAUAU	AUAUCACUC CGAUGACA
3950	CACUGGAG CUGAUGA X GAA ACACGGUG	CACCGUGUA CUCCAGUG
3953	CCUCACUG CUGAUGA X GAA AGUACACG	CGUGUACUC CAGUGAGG
3972	AGCUUUAA CUGAUGA X GAA AGUUCUGC	GCAGAACUU UUAAAGCU
3973	CAGCUUUA CUGAUGA X GAA AAGUUCUG	CAGAACUUU UAAAGCUG
30	3974 UCAGCUUU CUGAUGA X GAA AAAGUUCU	AGAACUUUU AAAGCUGA
3975	AUCAGCUU CUGAUGA X GAA AAAAGUUC	GAACUUUU AAGCUGAU
3984	CCAAUCUC CUGAUGA X GAA AUCAGCUU	AAGCUGUA GAGAUUGG
3990	UGCACUCC CUGAUGA X GAA AUCUCTAU	AUAGAGAUU GGAGUGCA

4006	GGCUGUGC CUGAUGA X GAA ACCGUUU	AAACCGGUA GCACAGCC
4020	GGCUGGAG CUGAUGA X GAA AUCUGGGC	GCCCAGAUU CUCCAGCC
4021	AGGCUGGA CUGAUGA X GAA AAUCUGGG	CCCAGAUUC UCCAGCCU
4023	UCAGGCUG CUGAUGA X GAA AGAAUCUG	CAGAUUCUC CAGCCUGA
5 4052	CAGGAGGA CUGAUGA X GAA AGCUCAGU	ACUGAGCUC UCCUCCUG
4054	AACAGGAG CUGAUGA X GAA AGAGCUA	UGAGCUCUC CUCCUGUU
4057	UUAAACAG CUGAUGA X GAA AGGAGAGC	GCUCUCCUC CUGUUUA
4062	UCCUUUUA CUGAUGA X GAA ACAGGAGG	CCUCCUGUU UAAAAGGA
4063	UUCUUUU CUGAUGA X GAA AACAGGAG	CUCCUGUUU AAAAGGAA
10 4064	CUUCCUU CUGAUGA X GAA AAACAGGA	UCCUGUUUA AAAGGAAG
4076	GGGGUGUG CUGAUGA X GAA AUGCUUCC	GGAAGCAUC CACACCCC
4089	AUGUCCGG CUGAUGA X GAA AGUUGGGG	CCCCAACUC CC GGACAU
4098	UCUCAUGU CUGAUGA X GAA AUGUCCGG	CCGGACAUC ACAUGAGA
4110	UCUGAGCA CUGAUGA X GAA ACCUCUCA	UGAGAGGUC UGCUCAGA
15 4115	CAAAAUCU CUGAUGA X GAA AGCAGACC	GGUCUGCUC AGAUUUUG
4120	CACUUCAA CUGAUGA X GAA AUCUGAGC	GCUCAGAUU UUGAAGUG
4121	ACACUUCA CUGAUGA X GAA AAUCUGAG	CUCAGAUUU UGAAGUGU
4122	AACACUUC CUGAUGA X GAA AAAUCUGA	UCAGAUUUU GAAGUGUU
4130	GAAAGAAC CUGAUGA X GAA ACACUUCA	UGAAGUGUU GUUCUUC
20 4133	GUGGAAAG CUGAUGA X GAA ACAACACU	AGUGUUGUU CUUCCAC
4134	GGUGGAAA CUGAUGA X GAA AACAAACAC	GUGUUGUUC UUCCACC
4136	CUGGUGGA CUGAUGA X GAA AGAACAAAC	GUUGUUCUU UCCACCAG
4137	GCUGGUGG CUGAUGA X GAA AAGAACAA	UUGUUCUUU CCACCAGC
4138	UGCUGGUG CUGAUGA X GAA AAAGAACAA	UGUUCUUUC CACCAGCA
25 4153	AAUGCAGG CUGAUGA X GAA ACUUCCUG	CAGGAAGUA GCCGCAUU
4161	GAAAAUCA CUGAUGA X GAA AUGCGGC	AGCCGCAUU UGAUUUUC
4162	UGAAAAUC CUGAUGA X GAA AAUGCGGC	GCCGCAUUU GAUUUUC
4166	GAAAUGAA CUGAUGA X GAA AUCAAAUG	CAUUGAUU UUCAUUUC
4167	CGAAAUGA CUGAUGA X GAA AAUCAAAU	AUUGAUUU UCAUUUCG
30 4168	UCGAAAUG CUGAUGA X GAA AAAUCAAA	UUUGAUUUU CAUUCG
4169	GUCGAAA CUGAUGA X GAA AAAUCAAA	UUGAUUUUC AUJUCGAC
4172	GUUGUCGA CUGAUGA X GAA AUGAAAAU	AUUUUCAUU UCGACAAAC
4173	UGUUGUGCG CUGAUGA X GAA AAUGAAAA	UUUUCAUUU CGACAAAC

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4174	CUGUUGUC CUGAUGA X GAA AAAUGAAA	UUUCAUUUC GACAACAG
4194	UGCAGUCC CUGAUGA X GAA AGGUCCUU	AAGGACCUC GGACUGCA
4214	GCCUAGAA CUGAUGA X GAA AGCUGGCU	AGCCAGCUC UUCUAGGC
4216	AAGCCUAG CUGAUGA X GAA AGAGCUGG	CCAGCUCUU CUAGGCUU
5 4217	CAAGCCUA CUGAUGA X GAA AAGAGCUG	CAGCUCUUC UAGGCUUG
4219	CACAAGCC CUGAUGA X GAA AGAAGAGC	GCUCUUCUA GGCUUGUG

Where "X" represents stem II region of a HH ribozyme (Hertel et al., 1992 *Nucleic Acids Res.* 20 3252). The length of stem II may be \geq 2 base-pairs.

Table V: Human KDR VEGF Receptor-Hairpin Ribozyme and Substrate Sequences

nt.	Position	Hairpin Ribozyme Sequence	Substrate
11		CGACGGCC AGAA GCACCU ACCAGAGAACACACAGUUGGUACAUUACCUGUA	AGGUGCU GCU GGCGUCG
5	18	CACAGGGC AGAA GCCAGC ACCAGAGAACACACAGUUGGUACAUUACCUGUA	GCUGGCC GUC GCCUGUG
51		CCCACAGA AGAA GCCCGG ACCAGAGAACACACAGUUGGUACAUUACCUGUA	CCGGGCC GCC UCUGUGGG
86		UGAGCCUG AGAA GAUCAA ACCAGAGAACACACAGUUGGUACAUUACCUGUA	UTGAUCU GCC CAGGUCA
318		GAGGCCAA AGAA GUUUC ACCAGAGAACACACAGUUGGUACAUUACCUGUA	GGAAACU GAC UGGCCUC
358		AAAUGGAG AGAA GUAAUC ACCAGAGAACACACAGUUGGUACAUUACCUGUA	GAUUACA GAU CUCAUUU
10	510	CUGUUACC AGAA GGAACA ACCAGAGAACACACAGUUGGUACAUUACCUGUA	UGUUCU GAU GGUAAACAG
623		ACAUAAUA AGAA GGUAAC ACCAGAGAACACACAGUUGGUACAUUACCUGUA	GUUACCA GUC UAUUAUGU
683		UUCCAUGA AGAA GACUCA ACCAGAGAACACACAGUUGGUACAUUACCUGUA	UGAGUCC GUC UCAUGGAA
705		UUUUCUCC AGAA GAUAGU ACCAGAGAACACACAGUUGGUACAUUACCUGUA	ACUAUCU GUU GGAGAAA
833		CACUCCCA AGAA GGGUUU ACCAGAGAACACACAGUUGGUACAUUACCUGUA	AAACCCA GUC UGGAGUG
15	932	UCUUGGUC AGAA GCCCAC ACCAGAGAACACACAGUUGGUACAUUACCUGUA	GUGGGCU GAU GACCAAGA
1142		CCAUAAUC AGAA GUACAU ACCAGAGAACACACAGUUGGUACAUUACCUGUA	AUGUACU GAC GAUUAUGG
1259		UCUCACCA AGAA GGGUG ACCAGAGAACACACAGUUGGUACAUUACCUGUA	CACCCCA GAU UGGUGAGA
1332		AUGGCAUA AGAA GUACAU ACCAGAGAACACACAGUUGGUACAUUACCUGUA	AUGUACG GUC UAUGCCAU

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1376	CUTCCUC AGAA GCCAAU ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	AUUGGCA GUU GGAGGAAG
1413	GUCACUGA AGAA GCUUGG ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	CCAAGCU GUC UCAGUGAC
1569	UUGUACAA AGAA GACACA ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	UGUGUCA GCU UGUACAA
1673	GCUCAGUG AGAA GCAUGU ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	ACAUGCA GGC CACUGAGC
5 1717	AAACGUAG AGAA GUCUGC ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	GCAGACA GAU CUACGUTU
1760	UJGGCAGA AGAA GUCCCC ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	GCCCACA GCC UCUGCCAA
1797	UUCUJUGCA AGAA GGUGUG ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	CACACCU GUU UGCAAGAA
1918	UUGAGCAA AGAA GACAUU ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	UAUGUCU GCC UJGGCTCAA
1967	GGACUGUG AGAA GCCUGA ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	UCAGGCA GCU CACAGUCC
10 1974	CGGCUCUAG AGAA GUGAGC ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	GCUCACA GUC CUAGAGCG
2021	UACUJUGUC AGAA GAUUCU ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	AGAAUCA GAC GACAAGUA
2084	ACCACAUU AGAA GUCCAG ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	CUCCACA GAU CAUGUGGU
2418	GGGAGUUIC AGAA GGAUCC ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	GGAUCCA GAU GAACUCCC
2453	CAUCAUAA AGAA GUCGTT ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	AACGACU GCC UUAUGAUG
15 2492	CUAGGUUC AGAA GGUCUC ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	GAGACCG GCU GAACCUAG
2547	CCAAAGGC AGAA GCTUCA ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	UGAAGCA GAU GCCUTUGG
2765	GGUAAGUG AGAA GGUTUC ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	GAAACCU GUC CACUTUCC
2914	AAAUCGAG AGAA GGCUGA ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	UCAGCCA GCU CUGGAUTU
2993	GCUCCAAG AGAA GGAAAG ACCAGAGAACACACGUTUGGGUACAUUACCUGGUAA	ACUUCU GAC CUUGGAGC

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3019	CACUTGGGA AGAA GUAACA ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	UGUUACA GCU UCCAGUG
3165	CUGACAUUA AGAA GGAUCU ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	AGAUCCA GAU UAUGUCAG
3378	GUAGUUA AGAA GGGGC ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	GGCCCCU GAU UAUACUAC
3404	CCAGCAUG AGAA GGUACA ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	UGUACCA GAC CAUGCUGG
5 3418	CCCGUGGC AGAA GUCCAG ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	CUGGACU GCU GGCACGGG
3575	GUGAGGUA AGAA GAGAGA ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	UCUCUCU GCC UACCUCAC
3588	AUACAGGA AGAA GGUGAG ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	CUCACCU GUU UCCUGUAU
3689	CACUCACAA AGAA GGGCUCU ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	AGAGCCG GCC UGUGAGUG
3753	UGGUUGUC AGAA GGGAU ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	AAUCCCA GAU GACAACCA
10 3764	CACUGUCC AGAA GGUUGU ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	ACAACCA GAC GGACAGUG
3911	GAUUAUCCG AGAA GGUAGC ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	GUUACCA GUC CGGAUACU
3927	UCUGUGUC AGAA GAGUGA ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	UCACUCC GAU GACACAGA
4011	AGAAUUCUG AGAA GUGCUA ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	UAGCACCA GCC CAGAUUCU
4016	GCUGGAGA AGAA GGGCUG ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	CAGGCCA GAU UCUCAGC
15 4025	CCGUGUCA AGAA GGAGAA ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	UUUCUCCU GCC UGACACGG
4059	UCCUTUTUA AGAA GGAGGA ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	UCCUCCU GUU UAAAAGGA
4111	AAAAUUCUG AGAA GACCUC ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	GAGGUCU GCU CAGAUUU
4116	ACUUCAAA AGAA GAGCAG ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	CUGCUCA GAU UTUGAAGU
4195	UCCCUGGCA AGAA GAGGUUC ACCAGAGAAAACACACCGUUGGUUACAUUACCUGGUA	GACCUCG GAC UGCAGGGGA

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GGAGCCA GCU CUCUAGG

CCUAGAAG AGAA GGCUCC ACCAGAGAACACACGUUGGUACAUUACCUUGUA

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Table VI: Mouse flk-1 VEGF Receptor-Hammerhead Ribozyme and Substrate Sequence

nt. Posi tion	HH Ribozyme Sequence	Substrate
13	CCGUACCC CUGAUGA X GAA AUUCGCC	GGGCGAAUU GGGUACGG
18	GGGUCCCCG CUGAUGA X GAA ACCCAAUU	AAUUGGGUA CGGGACCC
31	UCGACCUC CUGAUGA X GAA AGGGGGGU	ACCCCCCCUC GAGGUCGA
37	AUACCGUC CUGAUGA X GAA ACCUCGAG	CUCGAGGUC GACGGUAU
10	44 CUUAUCGA CUGAUGA X GAA ACCGUCGA	UCGACGGUA UCGAUAAG
	46 AGCUUAUC CUGAUGA X GAA AUACCGUC	GACGGUAUC GAUAAGCU
	50 AUCAAGCU CUGAUGA X GAA AUCGAUAC	GUAUCAUA AGCUUGAU
	55 UCGAUAUC CUGAUGA X GAA AGCUUAUC	GAUAAGCUU GAUAUCGA
	59 GAAUUCGA CUGAUGA X GAA AUCAAGCU	AGCUUGAUU UCGAAUUC
15	61 CCGAAUUC CUGAUGA X GAA AUAUCAAG	CUUGAUUAUC GAAUUCGG
	66 UGGGCCCG CUGAUGA X GAA AUUCGAUA	UAUCGAAUU CGGGCCCA
	67 CUGGGCCC CUGAUGA X GAA AAUUCGAU	AUCGAAUJC GGGCCCAG
	83 GGCUGCGG CUGAUGA X GAA ACACAGUC	GACUGUGUC CCGCAGCC
	97 AGCCAGGU CUGAUGA X GAA AUCCCGGC	GCCGGGAUA ACCUGGCU
20	114 GUCCGCGG CUGAUGA X GAA AUCGGGUC	GACCCGAUUU CCGCGGAC
	115 UGUCCGCG CUGAUGA X GAA AAUCGGGU	ACCCGAUUC CGCGGACA
	169 ACCGGGGA CUGAUGA X GAA AGCGCGGG	CCCGCGCUC UCCCCGGU
	171 AGACCGGG CUGAUGA X GAA AGAGCGCG	CGCGCUCUC CCCGGUCU
	178 CAGCGCAA CUGAUGA X GAA ACCGGGGA	UCCCCGGUC UUGCGCUG
25	180 CGCAGCGC CUGAUGA X GAA AGACCGGG	CCCGGUCUU GCGCUGCG
	197 AGAGGCAG CUGAUGA X GAA AUGGCCCC	GGGGCCAUA CCGCCUCU
	204 AAGUCACA CUGAUGA X GAA AGGCGGU	UACCGCCUC UGUGACUU
	212 CCGCAAAG CUGAUGA X GAA AGUCACAG	CUGUGACUU CUUUGCGG
	213 CCCGCAAA CUGAUGA X GAA AAGUCACA	UGUGACUUC UUUGCGGG
30	215 GGCCCCGA CUGAUGA X GAA AGAAGUCA	UGACUUCUU UGCAGGGCC

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216	UGGCCCGC CUGAUGA X GAA AAGAACUC	GACUUCUUU CGGGGCCA
241	CAGGCACA CUGAUGA X GAA ACUCCUUC	GAAGGAGUC UGUGCCUG
262	UGGGCACA CUGAUGA X GAA AGCCCAGU	ACUGGGCUC UGUGCCA
306	GCGACAGC CUGAUGA X GAA AGCAGCGC	GCGCUGCUA GCUGUCGC
5	312 CACAGAGC CUGAUGA X GAA ACAGCUAG	CUAGCUGUC GCUCUGUG
316	GAACCACA CUGAUGA X GAA AGCGACAG	CUGUCGCUC UGUGGUUC
323	CCACGCAG CUGAUGA X GAA ACCACAGA	UCUGUGGUU CUGCGUGG
324	UCCACGCA CUGAUGA X GAA AACCAACAG	CUGUGGUUC UGCGUGGA
347	AACCCACA CUGAUGA X GAA AGGCGGCU	AGCCGCCUC UGUGGGUU
10	355 GCCAGUCA CUGAUGA X GAA ACCCACAG	CUGUGGGUU UGACUGGC
356	CGCCAGUC CUGAUGA X GAA AACCCACA	UGUGGGUUU GACUGGCG
367	AUGGAGAA CUGAUGA X GAA AUCGCCAG	CUGGCGAUU UUCUCCAU
368	GAUGGGAGA CUGAUGA X GAA AAUCGCCA	UGGCGAUUU UCUCCAUC
369	GGAUGGGAG CUGAUGA X GAA AAAUCGCC	GGCGAUUUU CUCCAUCC
15	370 GGGGAUGGA CUGAUGA X GAA AAAAUCGC	GCGAUUUUC UCCAUCCC
372	GGGGGAUG CUGAUGA X GAA AGAAAAUC	GAUUUUCUC CAUCCCC
376	CUUGGGGG CUGAUGA X GAA AUGGAGAA	UUCUCCAU CCCCCAAG
387	UGUGUGCU CUGAUGA X GAA AGCUUGGG	CCCAAGCUC AGCACACA
405	AUUGUCAG CUGAUGA X GAA AUGCUUU	AAAGACAU A CUGACAAU
20	414 UUUGCCAA CUGAUGA X GAA AUUGUCAG	CUGACAAUU UJGGCAAA
415	AUUUGCCA CUGAUGA X GAA AAUUGUCA	UGACAAUUU UGGCAAAU
416	UAUUJUGCC CUGAUGA X GAA AAAUUGUC	GACAAUUU GGCAAUA
424	AAGGGUUG CUGAUGA X GAA AUUUGCCA	UGGCAAUA CAACCCUU
432	GUAAUCUG CUGAUGA X GAA AGGGUUGU	ACAACCCUU CAGAUUAC
25	433 AGUAAUCU CUGAUGA X GAA AAGGGUUG	CAACCCUUC AGAUUACU
438	CUGCAAGU CUGAUGA X GAA AUCUGAAG	CUUCAGAUU ACUUGCAG
439	CCUGCAAG CUGAUGA X GAA AAUCUGAA	UUCAGAUUA CUUGCAGG
442	UCCCCUGC CUGAUGA X GAA AGUAAUCU	AGAUUACUU GCAGGGGA
471	UUGGGCCA CUGAUGA X GAA AGCCAGUC	GACUGGCUU UGGCCCAA
30	472 AUUGGGCC CUGAUGA X GAA AAGCCAGU	ACUGGCUUU GGCCCAAU

484	AUCACGCU CUGAUGA X GAA AGCAUJUGG	CCAAUGCUC AGCGUGAU
493	UUCCUCAG CUGAUGA X GAA AUCACGCU	AGCGUGAUU CUGAGGAA
494	UUUCCUCA CUGAUGA X GAA AAUCACGC	GCGUGAUUC UGAGGAAA
507	GUCACCAA CUGAUGA X GAA ACCCUUUC	GAAAGGGUA UUGGUGAC
5	509 CAGUCACC CUGAUGA X GAA AUACCCUU	AAGGGUAUJ GGUGACUG
538	GCAGAAGA CUGAUGA X GAA ACUGUCAC	GUGACAGUA UCUUCUGC
540	UUGCAGAA CUGAUGA X GAA AUACUGUC	GACAGUAUC UUCUGCAA
542	UUUUGCAG CUGAUGA X GAA AGAUACUG	CAGUAUCUU CUGAAAAA
543	GUUUUGCA CUGAUGA X GAA AAGAUACU	AGUAUCUJC UGCAAAAC
10	555 GGAAUGGU CUGAUGA X GAA AGUGUUU	AAAACACUC ACCAUUCC
561	ACCCUGGG CUGAUGA X GAA AUGGUGAG	CUCACCAUU CCCAGGGU
562	CACCCUGG CUGAUGA X GAA AAUGGUGA	UCACCAUUC CCAGGGUG
573	UCAUUUCC CUGAUGA X GAA ACCACCCU	AGGGUGGUU GGAAAUGA
583	GGCUCCAG CUGAUGA X GAA AUCAUJUC	GAAAUGAUJ CUGGAGCC
15	593 AGCACUUG CUGAUGA X GAA AGGCCA	UGGAGCCUA CAAGUGCU
602	CCCGGUAC CUGAUGA X GAA AGCACUUG	CAAGUGGCUC GUACCGGG
605	CGUCCCCG CUGAUGA X GAA ACGAGCAC	GUGCUCGUA CCGGGACG
615	GCUAUGUC CUGAUGA X GAA ACGUCCCG	CGGGACGUC GACAUAGC
621	GUGGAGGC CUGAUGA X GAA AUGUCGAC	GUCGACAUA GCCUCCAC
20	626 AACAGUG CUGAUGA X GAA AGGCUAUG	CAUAGCCUC CACUGUUU
633	UAGACAU CUGAUGA X GAA ACAGUGGA	UCCACUGUU UAUGUCUA
634	AUAGACAU CUGAUGA X GAA AACAGUGG	CCACUGUUU AUGUCUAU
635	CAUAGACA CUGAUGA X GAA AAACAGUG	CACUGUUUA UGUCUAUG
639	CGAACAU CUGAUGA X GAA ACAUAAAC	GUUUAUGUC UAUGUJCG
25	641 CUCGAACA CUGAUGA X GAA AGACAUAA	UUAUGUCUA UGUUCGAG
645	UAAUCUCG CUGAUGA X GAA ACAUAGAC	GUCUAUGUU CGAGAUUA
646	GUAAUCUC CUGAUGA X GAA AACAUAGA	UCUAUGUJC GAGAUUAC
652	UGAUCUGU CUGAUGA X GAA AUCUCGAA	UUCGAGAUU ACAGAUCA
653	GUGAUCUG CUGAUGA X GAA AAUCUCGA	UCGAGAUUA CAGAUCAC
30	659 UGAAUGGU CUGAUGA X GAA AUCUGUAA	UUACAGAUC ACCAUUCA

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665	AGGCAGAUG CUGAUGA X GAA AUGGUGAU	AUCACCAUU CAUCGCCU
666	GAGGCGAU CUGAUGA X GAA AAUGGUGA	UCACCAUUC AUCGCCUC
669	ACAGAGGC CUGAUGA X GAA AUGAAUGG	CCAUUCAUC GCCUCUGU
674	CACUGACA CUGAUGA X GAA AGGCGAUG	CAUCGCCUC UGUCAGUG
5	678 UGGUCACU CUGAUGA X GAA ACAGAGGC	GCCUCUGUC AGUGACCA
696	AUGUACAC CUGAUGA X GAA AUGCCAUG	CAUGGCAUC GUGUACAU
701	CGGUGAUG CUGAUGA X GAA ACACGAUG	CAUCGUGUA CAUCACCG
705	UUCUCGGU CUGAUGA X GAA AUGUACAC	GUGUACAUUC ACCGAGAA
735	CGGCAGGG CUGAUGA X GAA AUCACCAC	GUGGUGAUC CCCUGCCG
10	749 UUGAAAUC CUGAUGA X GAA ACCCUCGG	CCGAGGGUC GAUUUCAA
753	AGGUUUGA CUGAUGA X GAA AUCGACCC	GGGUCGAUU UCAAACCU
754	GAGGUUUG CUGAUGA X GAA AAUCGACC	GGUCGAUUU CAAACCUC
755	UGAGGUUU CUGAUGA X GAA AAAUCGAC	GUCGAUUUC AAACCUCA
762	GACACAUU CUGAUGA X GAA AGGUUJGA	UCAAACCUUC AAUGUGUC
15	770 CGCAAAGA CUGAUGA X GAA ACACAUUG	CAAUGUGUC UCJJUGCG
772	AGCGCAAA CUGAUGA X GAA AGACACAU	AUGUGUCUC UUUGCUCU
774	CUAGCGCA CUGAUGA X GAA AGAGACAC	GUGUCUCUU UGCGCUAG
775	CCUAGCGC CUGAUGA X GAA AAGAGACA	UGUCUCUUU GCGCUAGG
781	UGGAUACC CUGAUGA X GAA AGCGCAAA	UUJUGCGCUA GGUAUCCA
20	785 UUUCUGGA CUGAUGA X GAA ACCUAGCG	CGCUAGGU A UCCAGAAA
787	CUUUUCUG CUGAUGA X GAA AUACCUAG	CUAGGUUC CAGAAAAG
800	CCGGAACA CUGAUGA X GAA AUCUCUUU	AAAGAGAUU UGUUCCGG
801	UCCGGAAC CUGAUGA X GAA AAUCUCUU	AAGAGAUU GUUCCGGA
804	CCAUCCGG CUGAUGA X GAA ACAAAUCU	AGAUUJGUU CCGGAUGG
25	805 UCCAUCGG CUGAUGA X GAA AACAAUC	GAUUJGUUC CGGAUGGA
822	UCCCAGGA CUGAUGA X GAA AUUCUGUU	AACAGAAUU UCCUGGGGA
823	GUCCCAAG CUGAUGA X GAA AAUUCUGU	ACAGAAUUU CCUGGGAC
824	UGUCCCAAG CUGAUGA X GAA AAAUUCUG	CAGAAUUUC CUGGGACA
840	GUAAAGCC CUGAUGA X GAA AUCUCGCU	AGCGAGAU A GGCUUUAC
30	845 GGAGAGUA CUGAUGA X GAA AGCCUAUC	GAUAGGCUU UACUCUCC

846	GGGAGAGU CUGAUGA X GAA AAGCCUAU	AUAGGCUUU ACUCUCCC
847	GGGGAGAG CUGAUGA X GAA AAAGCCUA	UAGGCUUUA CUCUCCCC
850	ACUGGGGA CUGAUGA X GAA AGUAAAAGC	GCUUUACUC UCCCCAGU
852	UAACUGGG CUGAUGA X GAA AGAGUAAA	UUUACUCUC CCCAGUUA
5	859 GAUCAUGU CUGAUGA X GAA ACUGGGGA	UCCCCAGUU ACAUGAUC
	860 UGAUCAUG CUGAUGA X GAA AACUGGGG	CCCCAGUUA CAUGAUCA
	867 GCAUAGCU CUGAUGA X GAA AUCAUGUA	UACAUGAUC AGCUAUGC
	872 UGCCGGCA CUGAUGA X GAA AGCUGAUC	GAUCAGCUA UGCCGGCA
	885 UCACAGAA CUGAUGA X GAA ACCAUGCC	GGCAUGGUC UUCUGUGA
10	887 CCUCACAG CUGAUGA X GAA AGACCAUG	CAUGGUCUU CUGUGAGG
	888 GCCUCACA CUGAUGA X GAA AAGACCAU	AUGGUCUUC UGUGAGGC
	903 UCAUCAUU CUGAUGA X GAA AUCUUUGC	GCAAAGAUC AAUGAUGA
	917 UAGACUGA CUGAUGA X GAA AGGUUUC	UGAAACCUA UCAGUCUA
	919 GAUAGACU CUGAUGA X GAA AUAGGUUU	AAACCUAUC AGCUAUC
15	923 ACAUGAUA CUGAUGA X GAA ACUGAUAG	CUAUCAGUC UAUCAUGU
	925 GUACAUGA CUGAUGA X GAA AGACUGAU	AUCAGUCUA UCAUGUAC
	927 AUGUACAU CUGAUGA X GAA AUAGACUG	CAGUCUAUC AUGUACAU
	932 CAACUAUG CUGAUGA X GAA ACAUGAUA	UAUCAUGUA CAUAGUUG
	936 ACCACAAAC CUGAUGA X GAA AUGUACAU	AUGUACAUUA GUUGUGGU
20	939 ACAACCAC CUGAUGA X GAA ACUAUGUA	UACAUAGUU GUGGUUGU
	945 UAUCCUAC CUGAUGA X GAA ACCACAAAC	GUUGUGGUU GUAGGAUA
	948 CUAUAUCC CUGAUGA X GAA ACAACCAC	GUGGUUGUA GGAAUUAAG
	953 AAAUCCUA CUGAUGA X GAA AUCCUACA	UGUAGGAUA UAGGAUUU
	955 AUAAAUCC CUGAUGA X GAA AUAUCCUA	UAGGAUUA GGAAUUUAU
25	960 ACAUCAUA CUGAUGA X GAA AUCCUAAU	UAUAGGAUU UAUGAUGU
	961 CACAUCAU CUGAUGA X GAA AAUCCUAU	AUAGGAUUU AUGAUGUG
	962 UCACAUCA CUGAUGA X GAA AAAUCCUA	UAGGAUUA UGAUGUGA
	972 GGGCUCAG CUGAUGA X GAA AUCACAU	GAUGUGAUU CUGAGCCC
	973 GGGCUCA CUGAUGA X GAA AAUCACAU	AUGUGAUJC UGAGCCCC
30	993 GAUAGCUC CUGAUGA X GAA AUUCAUG	CAUGAAAUU GAGCUAUC

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999	CCGGCAGA CUGAUGA X GAA AGCUAAU	AUUGAGCUA UCUGCCGG
1001	CUCGGCA CUGAUGA X GAA AUAGCUA	UGAGCUAUC UGCCGGAG
1017	UUUAAGAC CUGAUGA X GAA AGUUUUUC	GAAAAACUU GUCUAAA
1020	CAAUUUAA CUGAUGA X GAA ACAAGUU	AAACUUGUC UUAAAUG
5	1022 UACAAUU CUGAUGA X GAA AGACAAGU	ACUUGUCUU AAAUUGUA
	1023 GUACAAUU CUGAUGA X GAA AAGACAAG	CUUGUCUUA AAUUGUAC
	1027 CGCUGUAC CUGAUGA X GAA AUUUAGA	UCUUAAAUU GUACAGCG
	1030 UCUCGCUG CUGAUGA X GAA ACAAUUUA	UAAAUUGUA CAGCGAGA
	1047 CCCACAUU CUGAUGA X GAA AGCUCUGU	ACAGAGCUC AAUGUGGG
10	1059 GUGAAAUC CUGAUGA X GAA AGCCCCAC	GUGGGGCUU GAUUCAC
	1063 CCAGGUGA CUGAUGA X GAA AUCAAGCC	GGCUUGAUU UCACCUGG
	1064 GCCAGGUG CUGAUGA X GAA AAUCAAGC	GCUUGAUUU CACCUGGC
	1065 UGCCAGGU CUGAUGA X GAA AAAUCAAG	CUUGAUUUC ACCUGGCA
	1076 AAGGUGGA CUGAUGA X GAA AGUGCCAG	CUGGCACUC UCCACCUU
15	1078 UGAAGGUG CUGAUGA X GAA AGAGUGCC	GGCACUCUC CACCUUCA
	1084 AGACUUUUG CUGAUGA X GAA AGGUGGAG	CUCCACCUU CAAAGUCU
	1085 GAGACUUU CUGAUGA X GAA AAGGUGGA	UCCACCUUC AAAGUCUC
	1091 UAUGAUGA CUGAUGA X GAA ACUUUGAA	UUCAAAGUC UCAUCAUA
	1093 CUUAUGAU CUGAUGA X GAA AGACUUUJG	CAAAGUCUC AUCAUAAG
20	1096 CUUCUUAU CUGAUGA X GAA AUGAGACU	AGUCUCAUC AUAAGAAG
	1099 AAUCUUCU CUGAUGA X GAA AUGAUGAG	CUCAUCAUA AGAAGAUU
	1107 CGGUUUUAC CUGAUGA X GAA AUCUUCUU	AAGAAGAUU GUAAACCG
	1110 UCCCAGGU CUGAUGA X GAA ACAAUUJU	AAGAUUGUA AACCGGGA
	1130 UCCCAGGA CUGAUGA X GAA AGGGUUUC	GAAACCCUU UCCUGGGA
25	1131 GUCCCAGG CUGAUGA X GAA AAGGGUUU	AAACCCUUU CCUGGGAC
	1132 AGUCCCAG CUGAUGA X GAA AAAGGGUU	AACCCUUUC CUGGGACU
	1154 UGCUCAAA CUGAUGA X GAA ACAUCUJC	GAAGAUGUU UUUGAGCA
	1155 GUGCUCAA CUGAUGA X GAA AACAUUJU	AAGAUGUUU UUGAGCAC
	1156 GGUGCUCA CUGAUGA X GAA AAACAUCU	AGAUGUUUU UGAGCACC
30	1157 AGGUGCUC CUGAUGA X GAA AAAACAUC	GAUGUUUUU GAGCACC

	1166	CUAUUGUC CUGAUGA X GAA AGGUGCUC	GAGCACCUU GACAAUAG
	1173	ACACUUUC CUGAUGA X GAA AUJUGUCAA	UUGACAAUA GAAAGUGU
	1205	CACAGGUG CUGAUGA X GAA AUUCCCCU	AGGGGAAUA CACCUGUG
	1215	CUGGACGC CUGAUGA X GAA ACACAGGU	ACCUGUGUA GCGUCCAG
5	1220	GUCCACUG CUGAUGA X GAA ACGCUACA	UGUAGCGUC CAGUGGAC
	1236	UUUCUCUU CUGAUGA X GAA AUCAUCCG	CGGAUGAUC AAGAGAAA
	1246	AAAUGUUC CUGAUGA X GAA AUUUCUCU	AGAGAAAUA GAACAUUU
	1253	CUCGGACA CUGAUGA X GAA AUGUUCUA	UAGAACAUU UGUCCGAG
	1254	ACUCGGAC CUGAUGA X GAA AAUGUUCU	AGAACAUUU GUCCGAGU
10	1257	UGAACUCG CUGAUGA X GAA ACAAAUGU	ACAUUUGUC CGAGUUCA
	1263	UUJUGUGUG CUGAUGA X GAA ACUCGGAC	GUCCGAGUU CACACAAA
	1264	CUUUGUGU CUGAUGA X GAA AACUCGGA	UCCGAGUUC ACACAAAG
	1276	AGCAAUAA CUGAUGA X GAA AGGCUUUG	CAAAGCCUU UUAUJGCU
	1277	AAGCAAAUA CUGAUGA X GAA AAGGCCUU	AAAGCCUUU UAUUGCNU
15	1278	AAAGCAAU CUGAUGA X GAA AAAGGCUU	AAGCCUUUU AUUGCNUU
	1279	GAAAGCAA CUGAUGA X GAA AAAAGGCU	AGCCUUUUUA UUGCNUUC
	1281	CCGAAAGC CUGAUGA X GAA AUAAAAGG	CCUUUUJAUU GCUUUCGG
	1285	ACUACCGA CUGAUGA X GAA AGCAAUAA	UUAUUGCNU UCGGUAGU
	1286	CACUACCG CUGAUGA X GAA AAGCAAAU	UAUUGCNUU CGGUAGUG
20	1287	CCACUACC CUGAUGA X GAA AAAGCAAU	AUUGCNUUUC GGUAGUGG
	1291	CAUCCCAC CUGAUGA X GAA ACCGAAAG	CUUUCGGUA GUGGGAUG
	1304	CCACCAAA CUGAUGA X GAA AUUJCAUC	GAUGAAAUC UUUGGUGG
	1306	UUCCACCA CUGAUGA X GAA AGAUUUCA	UGAAAUCUU UGGUGGAA
	1307	CUUCCACC CUGAUGA X GAA AAGAUUUC	GAAAUCUU GGUGGAAG
25	1330	UCGGACUU CUGAUGA X GAA ACUGCCCA	UGGGCAGUC AAGUCCGA
	1335	GGGAUUCG CUGAUGA X GAA ACUUGACU	AGUCAAGUC CGAAUCCC
	1341	UUCACAGG CUGAUGA X GAA AUUCCGAC	GUCCGAAUC CCUGUGAA
	1352	AACUGAGA CUGAUGA X GAA ACUUCACA	UGUGAAGUA UCUCAGUU
	1354	GUAACUGA CUGAUGA X GAA AUACUJCA	UGAAGUAUC UCAGUUAC
30	1356	GGGUACU CUGAUGA X GAA AGAUACUU	AAGUAUCUC AGUUACCC

	1360	AGCUGGGU CUGAUGA X GAA ACUGAGAU	AUCUCAGUU ACCCAGCU
	1361	GAGCUGGG CUGAUGA X GAA AACUGAGA	UCUCAGUUA CCCAGCUC
	1369	GAUaucag CUGAUGA X GAA AGCUGGGU	ACCCAGCUC CUGAUUAUC
	1375	CCAuuuga CUGAUGA X GAA AUCAGGAG	CUCCUGAUUA UCAAAUUGG
5	1377	UACCAUUU CUGAUGA X GAA AUaucagg	CCUGAUUAUC AAAUGGUA
	1385	CAUUUCUG CUGAUGA X GAA ACCAUUUG	CAAAUUGGUA CAGAAAUG
	1404	UUGGACUC CUGAUGA X GAA AUGGGCCU	AGGCCAUU GAGUCCAA
	1409	UGUAGUUG CUGAUGA X GAA ACUCAAUG	CAUUGAGUC CAACUACA
	1415	UCAUUGUG CUGAUGA X GAA AGUUGGAC	GUCCAACUA CACAAUGA
10	1425	UCGCCAAC CUGAUGA X GAA AUCAUUGU	ACAAUUGAUU GUUGGCAGA
	1428	UCAUCGCC CUGAUGA X GAA ACAAUCAU	AUGAUJGUU GGCAGAUGA
	1440	AUGAUGGU CUGAUGA X GAA AGUUCAUC	GAUGAACUC ACCAUCAU
	1446	ACUUCCAU CUGAUGA X GAA AUGGUGAG	CUCACCAUC AUGGAAGU
	1478	UGACCGUG CUGAUGA X GAA AGUUUCCU	AGGAAACUA CACGGUCA
15	1485	GUGAGGAU CUGAUGA X GAA ACCGUGUA	UACACGGUC AUCCUCAC
	1488	UUGGUGAG CUGAUGA X GAA AUGACCGU	ACGGUCAUC CUCACCAA
	1491	GGGUUGGU CUGAUGA X GAA AGGAUGAC	GUCAUCCUC ACCAACCC
	1503	UCCAUUGA CUGAUGA X GAA AUGGGUU	AACCCCAUU UCAAUGGA
	1504	CUCCAUUG CUGAUGA X GAA AAUGGGGU	ACCCCAUUU CAAUGGAG
20	1505	UCUCCAUU CUGAUGA X GAA AAAUGGGG	CCCCAUUUC AAUGGAGA
	1530	ACCAGAGA CUGAUGA X GAA ACCAUGUG	CACAUGGUC UCUCUGGU
	1532	CAACCAGA CUGAUGA X GAA AGACCAUG	CAUGGUCUC UCUGGUJUG
	1534	CACAACCA CUGAUGA X GAA AGAGACCA	UGGUCUCUC UGGUUGUG
	1539	ACAUUCAC CUGAUGA X GAA ACCAGAGA	UCUCUGGUU GUGAAUGU
25	1548	UGGGGUGG CUGAUGA X GAA ACAUUCAC	GUGAAUGUC CCACCCCA
	1560	UUCUCACC CUGAUGA X GAA AUCUGGGG	CCCCAGAUC GGUGAGAA
	1574	GCGAGAUC CUGAUGA X GAA AGGCUUUC	GAAAGCCUU GAUCUCGC
	1578	AUAGGCAGA CUGAUGA X GAA AUCAAGGC	GCCUJUGAUC UCGCCUAU
	1580	CCAUAGGC CUGAUGA X GAA AGAUCAAG	CUUGAUCUC GCCUAUGG
30	1585	GGAAUCCA CUGAUGA X GAA AGGCGAGA	UCUCGCCUA UGGAUUCC

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1591	CUGGUAGG CUGAUGA X GAA AUCCAUAG	CUAUGGAUU CCUACCAG
1592	ACUGGUAG CUGAUGA X GAA AAUCCAU	UAUGGAAUJC CUACCAGU
1595	CAUACUGG CUGAUGA X GAA AGGAAUCC	GGAUUCUA CCAGUAUG
1601	UGGUCCCCA CUGAUGA X GAA ACUGGUAG	CUACCAGUA UGGGACCA
5	1619 UGCAUGUC CUGAUGA X GAA AUGUCUGC	GCAGACAUU GACAUGCA
	1632 UUGGCGUA CUGAUGA X GAA ACUGUGCA	UGCACAGUC UACGCCAA
	1634 GGUJGGCG CUGAUGA X GAA AGACUGUG	CACAGUCUA CGCCAACC
	1645 GUGCAGGG CUGAUGA X GAA AGGGUUGG	CCAACCCUC CCCUGCAC
	1659 UACCACUG CUGAUGA X GAA AUGUGGUG	CACCACAU CAGUGGUA
10	1667 GCUGCCAG CUGAUGA X GAA ACCACUGG	CCAGUGGU CUGGCAGC
	1677 GCUUCUUC CUGAUGA X GAA AGCUGCCA	UGGCAGCUA GAAGAACG
	1691 GUCUGUAG CUGAUGA X GAA AGCAGGCU	AGCCUGCUC CUACAGAC
	1694 CGGGUCUG CUGAUGA X GAA AGGAGCAG	CUGCUCCUA CAGACCCG
	1718 UACAAGCA CUGAUGA X GAA ACGGGCUU	AAGCCCGUA UGCUUGUA
15	1723 UUCUUUAC CUGAUGA X GAA AGCAUACG	CGUAUGCUU GUAAAAGAA
	1726 CCAUUCUU CUGAUGA X GAA ACAAGCAU	AUGCUUGUA AAGAAUGG
	1750 CCCCUGGA CUGAUGA X GAA AUCCUCCA	UGGAGGAUU UCCAGGGG
	1751 CCCCCUUGG CUGAUGA X GAA AAUCCUCC	GGAGGAUUU CCAGGGGG
	1752 CCCCCCUG CUGAUGA X GAA AAAUCCUC	GAGGAUUUC CAGGGGGG
20	1770 GUGACUUC CUGAUGA X GAA AUCUUGUU	AACAAGAUC GAAGUCAC
	1776 UUUUUGGU CUGAUGA X GAA ACUUCGAU	AUCGAAGUC ACCAAAAA
	1790 UCAGGGCA CUGAUGA X GAA AUUGGUUU	AAACCAAUA UGCCUGA
	1800 UUUCCUUC CUGAUGA X GAA AUCAGGGC	GCCCUGAUU GAAGGAAA
	1821 AGCGUACU CUGAUGA X GAA ACAGUUUU	AAAACUGUA AGUACGCU
25	1825 GACCAGCG CUGAUGA X GAA ACUUACAG	CUGUAAGUA CGCUGGUC
	1833 GCUUGGAU CUGAUGA X GAA ACCAGCGU	ACGCUGGUC AUCCAAGC
	1836 GCAGCUUG CUGAUGA X GAA AUGACCAG	CUGGUCAUC CAAGCUGC
	1853 ACAACGCU CUGAUGA X GAA ACACGUUG	CAACGUGUC AGCGUUGU
	1859 AUUUGUAC CUGAUGA X GAA ACGCUGAC	GUCAGCGUU GUACAAAU
30	1862 CACAUUJG CUGAUGA X GAA ACAACGCU	AGCGUUGUA CAAAUGUG

	1878	GCUUUGUU CUGAUGA X GAA AUGCUUC	GAAGCCAUC AACAAAGC
	1905	AAGGAGAU CUGAUGA X GAA ACCCUCUC	GAGAGGGUC AUCUCCUU
	1908	UGGAAGGA CUGAUGA X GAA AUGACCCU	AGGGUCAUC UCCUCCCA
	1910	CAUGGAAG CUGAUGA X GAA AGAUGACC	GGUCAUCUC CUUCCAU
5	1913	UCACAUGG CUGAUGA X GAA AGGAGAUG	CAUCUCCUU CCAUGUGA
	1914	AUCACAUG CUGAUGA X GAA AAGGAGAU	AUCUCCUUC CAUGUGAU
	1923	GGACCCCCU CUGAUGA X GAA AUCACAUG	CAUGUGAUC AGGGGUCC
	1930	AAUUCAG CUGAUGA X GAA ACCCCUGA	UCAGGGGUUC CUGAAAUU
	1938	UGCACAGU CUGAUGA X GAA AUUUCAGG	CCUGAAAUU ACUGUGCA
10	1939	UUGCACAG CUGAUGA X GAA AAUUCAG	CUGAAAUUA CUGUGCAA
	1982	ACAACAGG CUGAUGA X GAA ACACACUC	GAGUGUGUC CCUGUUGU
	1988	CAGUGCAC CUGAUGA X GAA ACAGGGAC	GUCCCUGUU GUGCACUG
	2008	CUCAAACG CUGAUGA X GAA AUUUCUGU	ACAGAAAUA CGUUJUGAG
	2012	GGUUCUCA CUGAUGA X GAA ACGUAUUU	AAAUACGUU UGAGAACCC
15	2013	AGGUUCUC CUGAUGA X GAA AACGUAUU	AAUACGUUU GAGAACCU
	2022	UACCACGU CUGAUGA X GAA AGGUUCUC	GAGAACUC ACUGGGUA
	2030	CAAGCUUG CUGAUGA X GAA ACCACGUG	CACGUGGUUA CAAGCUUG
	2037	UGUGAGCC CUGAUGA X GAA AGCUUGUA	UACAAGCUU GGCUACACA
	2042	UUGCCUGU CUGAUGA X GAA AGCCAAGC	GCUUGGCUC ACAGGCAA
20	2054	UGUGGACC CUGAUGA X GAA AUGUUGCC	GGCAACAUUC GGUCACACA
	2058	CCCAUGUG CUGAUGA X GAA ACCGAUGU	ACAUCGGUC CACAUGGG
	2072	GUGUGAGU CUGAUGA X GAA AUUCGCC	GGCGAAUC ACUCACAC
	2076	ACUGGUGU CUGAUGA X GAA AGUGAUUC	GAAUCACUC ACACCAAGU
	2085	UUCUUGCA CUGAUGA X GAA ACUGGUGU	ACACCAGUU UGCAAGAA
25	2086	GUUCUUGC CUGAUGA X GAA AACUGGUG	CACCAAGUUU GCAAGAAC
	2096	GAGCAUCC CUGAUGA X GAA AGUUCUUG	CAAGAACUU GGAUGCUC
	2104	UUUCCAAA CUGAUGA X GAA AGCAUCC	UGGAUGCUC UUUGGAAA
	2106	AGUUUCCA CUGAUGA X GAA AGAGCAUC	GAUGCUCUU UGGAAACU
	2107	CAGUUUCC CUGAUGA X GAA AAGAGCAU	AUGCUCUUU GGAAACUG
30	2129	UGUUAGAA CUGAUGA X GAA ACAUGGUG	CACCAAGUU UUCUAACA

2130	CUGUUAGA CUGAUGA X GAA AAC AUGGU	ACCAUGUUU UCUAACAG
2131	GCUGUUAG CUGAUGA X GAA AAACAUGG	CCAUGUUUU CUAACAGC
2132	UGCUGUUA CUGAUGA X GAA AAAACAUG	CAUGUUUUC UAACAGCA
2134	UGUGCUGU CUGAUGA X GAA AGAAAACA	UGUUUUCUA ACAGCACA
5	2151 ACAAUCAA CUGAUGA X GAA AUGUCAUU	AAUGACAUC UUGAUUGU
	2153 CCACAAUC CUGAUGA X GAA AGAUGUCA	UGACAUUU GAUUGUGG
	2157 AAUGCCAC CUGAUGA X GAA AUCAAGAU	AUCUJGAUU GUGGCAUU
	2165 CAUUCUGA CUGAUGA X GAA AUGCCACA	UGUGGCAUU UCAGAAUG
10	2166 GCAUUCUG CUGAUGA X GAA AAUGCCAC	GUGGCAUUU CAGAAUGC
	2167 GGCAUUCU CUGAUGA X GAA AAAUGCCA	UGGCAUUUC AGAAUGCC
	2177 CCUGCAGA CUGAUGA X GAA AGGCAUUC	GAAUGCCUC UCUGCAGG
	2179 GUCCUGCA CUGAUGA X GAA AGAGGCAU	AUGCCUCUC UGCAGGAC
	2198 AGCAAACA CUGAUGA X GAA AGUCGCCU	AGGCGACUA UGUUJGCU
	2202 GCAGAGCA CUGAUGA X GAA ACAUAGUC	GACUAUGUU UGCUCUGC
15	2203 AGCAGAGC CUGAUGA X GAA AACAUAGU	ACUAUGUUU GCUCUGCU
	2207 CUJGAGCA CUGAUGA X GAA AGCAAACA	UGUUUJGCU UGCUCUAG
	2212 CUUAUCUU CUGAUGA X GAA AGCAGAGC	GCUCUGCUC AAGAUAAAG
	2218 GGUCUUCU CUGAUGA X GAA AUCUUGAG	CUCAAGAUU AGAAGACC
	2239 GACCAGGC CUGAUGA X GAA AUGUCUUU	AAAGACAUU GCCUGGUC
20	2247 AGCUGUUU CUGAUGA X GAA ACCAGGCA	UGCCUGGUC AAACAGCU
	2256 AGGAUGAU CUGAUGA X GAA AGCUGUUU	AAACAGCUC AUCAUCCU
	2259 UCUAGGAU CUGAUGA X GAA AUGAGCUG	CAGCUCAUC AUCCUAGA
	2262 CGCUCUAG CUGAUGA X GAA AUGAUGAG	CUCAUCAUC CUAGAGCG
	2265 AUGCGCUC CUGAUGA X GAA AGGAUGAU	AUCAUCCUA GAGCGCAU
25	2286 UUUCCGGU CUGAUGA X GAA AUCAUGGG	CCCAUGAUC ACCGGAAA
	2296 AUUCUCCA CUGAUGA X GAA AUUCCGG	CCGGAAAUC UGGAGAAU
	2305 UGUUGUCU CUGAUGA X GAA AUUCUCCA	UGGAGAAUC AGACAACA
	2319 GUCUCGCC CUGAUGA X GAA AUGGUUGU	ACAACCAUU GGCGAGAC
	2331 GUCACUUC CUGAUGA X GAA AUGGUCUC	GAGACCAUU GAAGUGAC
30	2341 UGCUGGGC CUGAUGA X GAA AGUCACUU	AAGUGACUU GCCCAGCA

2351	GAUUUCCA CUGAUGA X GAA AUGCUGGG	CCCAGCAUC UGGAAAUC
2359	UGGGGUAG CUGAUGA X GAA AUUUCAG	CUGGAAAUC CUACCCCA
2362	GUGUGGGG CUGAUGA X GAA AGGAUUC	GAAAUCUA CCCCCACAC
2373	AACCAUGU CUGAUGA X GAA AUGUGGG	CCACACAUU ACAUGGUU
5	2374 GAACCAUG CUGAUGA X GAA AAUGUGUG	CACACAUUA CAUGGUUC
	2381 UGUCUUUG CUGAUGA X GAA ACCAUGUA	UACAUGGUU CAAAGACA
	2382 UUGUCUUU CUGAUGA X GAA AACCAUGU	ACAUGGUUC AAAGACAA
	2403 GAAUCUUC CUGAUGA X GAA ACCAGGGU	ACCCUGGUUA GAAGAUUC
	2410 AAUGCCUG CUGAUGA X GAA AUCUUCUA	UAGAAGAUU CAGGCAUU
10	2411 CAAUGCCU CUGAUGA X GAA AAUCUUCU	AGAAGAUUC AGGCAUUG
	2418 CUCAGUAC CUGAUGA X GAA AUGCCUGA	UCAGGCAUU GUACUGAG
	2421 UCUCUCAG CUGAUGA X GAA ACAAUGCC	GGCAUUGUA CUGAGAGA
	2449 CCUGCGGA CUGAUGA X GAA AGUCAGGU	ACCUGACUA UCCGCAGG
	2451 ACCCUGCG CUGAUGA X GAA AUAGUCAG	CUGACUAUC CGCAGGGU
15	2481 CAGGUGUA CUGAUGA X GAA AGGCCUCC	GGAGGCCUC UACACCUG
	2483 GGCAGGUG CUGAUGA X GAA AGAGGCCU	AGGCCUCUA CACCUGCC
	2505 CAGCCAAG CUGAUGA X GAA ACAUUGCA	UGCAAUGUC CUUGGCUG
	2508 GCACAGCC CUGAUGA X GAA AGGACAUU	AAUGUCCUU GGCUGUGC
	2532 AUUAUGAA CUGAUGA X GAA AGCGUCUC	GAGACGCUC UUCAUAAU
20	2534 CUAUUAUG CUGAUGA X GAA AGAGCGUC	GACGCUCUU CAUAAUAG
	2535 UCUAUUAU CUGAUGA X GAA AAGAGCGU	ACGCUCUUC AUAAUAGA
	2538 CCUUCUAU CUGAUGA X GAA AUGAAGAG	CUCUUCAUA AUAGAAGG
	2541 GCACCUUC CUGAUGA X GAA AUUAUGAA	UUCAUAAUA GAAGGUGC
	2567 UGACUUCC CUGAUGA X GAA AGUUGGUC	GACCAACUU GGAAGUCA
25	2574 AGGAUAAU CUGAUGA X GAA ACUUCCAA	UUGGAAGUC AUUAUCCU
	2577 ACGAGGAU CUGAUGA X GAA AUGACUUC	GAAGUCAUU AUCCUCGU
	2578 GACGAGGA CUGAUGA X GAA AAUGACUU	AAGUCAUA UCCUCGUC
	2580 CCGACGAG CUGAUGA X GAA AUAAUGAC	GUCAUUAUC CUCGUCGG
	2583 GUGCCGAC CUGAUGA X GAA AGGAUAAU	AUUAUCCUC GUCGGCAC
30	2586 GCAGUGCC CUGAUGA X GAA ACGAGGAU	AUCCUCGUC GGCACUGC

2601	AACAUGGC CUGAUGA X GAA AUCACUGC	GCAGUGAUU GCCAUGUU
2609	GCCAGAAG CUGAUGA X GAA ACAUGGCA	UGCCAUGUU CUUCUGGC
2610	AGCCAGAA CUGAUGA X GAA AACAUAGC	GCCAUGUUC UUCUGGCC
2612	GGAGCCAG CUGAUGA X GAA AGAACAAU	CAUGUUCUU CUGGCCUCC
5	2613 AGGAGCCA CUGAUGA X GAA AAGAACAU	AUGUUCUUC UGGCUCCU
2619	ACAAGAAG CUGAUGA X GAA AGCCAGAA	UUCUGGCUC CUUCUUGU
2622	AUGACAAG CUGAUGA X GAA AGGAGCCA	UGGCUCCUU CUUGUCAU
2623	AAUGACAA CUGAUGA X GAA AAGGAGCC	GGCUCCUUC UUGUCAUU
2625	ACAAUAGAC CUGAUGA X GAA AGAAGGAG	CUCCUUCUU GUCAUUGU
10	2628 AGGACAAU CUGAUGA X GAA ACAAGAAG	CUUCUUGUC AUUGUCCU
2631	CGUAGGAC CUGAUGA X GAA AUGACAAG	CUUGUCAUU GUCCUACG
2634	GUCCGUAG CUGAUGA X GAA ACAAUAGC	GUCAUUGUC CUACGGAC
2637	ACGGUCCG CUGAUGA X GAA AGGACAAU	AUUGUCCUA CGGACCGU
2646	GCCCACUU CUGAUGA X GAA ACGGUCCG	CGGACCGUU AAGCGGGC
15	2647 GGCCCCGU CUGAUGA X GAA AACGGUCC	GGACCGUUA AGCGGGCC
2681	UAGACAAG CUGAUGA X GAA AGCCUGUC	GACAGGCUA CUUGUCUA
2684	CAAUAGAC CUGAUGA X GAA AGUAGCCU	AGGCUACUU GUCUAUUG
2687	UGACAAUA CUGAUGA X GAA ACAAGUAG	CUACUUGUC UAUJUGUCA
2689	CAUGACAA CUGAUGA X GAA AGACAAGU	ACUUGUCUA UUGUCAUG
20	2691 UCCAUGAC CUGAUGA X GAA AUAGACAA	UUGUCUAAU GUCAUGGA
2694	GGAUCCAU CUGAUGA X GAA ACAAUAGA	UCUAUUGUC AUGGAUCC
2701	UUCAUCUG CUGAUGA X GAA AUCCAUCA	UCAUGGAUC CAGAUGAA
2711	CCAAGGGC CUGAUGA X GAA AUUCAUCU	AGAUGAAUU GCCCUUUGG
2717	GCUCAUCC CUGAUGA X GAA AGGGCAAU	AUUGCCUU GGAUGAGC
25	2738 CAUAAGGC CUGAUGA X GAA AGCGUUC	UGAACGCUU GCCUUAUG
2743	GGCAUCAU CUGAUGA X GAA AGGCAAGC	GCUUGCCUU AUGAUGCC
2744	UGGCAUCA CUGAUGA X GAA AAGGCAAG	CUUGCCUUJA UGAUGCCA
2765	CCCUGGGG CUGAUGA X GAA AUUCCAC	GUGGGAAUU CCCAGGG
2766	UCCCUGGG CUGAUGA X GAA AAUUCCCA	UGGGAAUUC CCCAGGGA
30	2787 GGUUUUUCC CUGAUGA X GAA AGUUUCAG	CUGAAACUA GGAAAACC

	2797	CGGGCCAA CUGAUGA X GAA AGGUUUUC	GAAAACCUC UUGGCCGC
	2799	CCGCGGCC CUGAUGA X GAA AGAGGUUU	AAACCUCUU GGCGCGG
	2813	CUUGGCCG CUGAUGA X GAA AGGCACCG	CGGUGCCUU CGGCCAAG
	2814	ACUUGGCC CUGAUGA X GAA AAGGCACC	GGUGCCUUC GGCCAAGU
5	2826	UCUGCCUC CUGAUGA X GAA AUCACUUG	CAAGUGAUU GAGGCAGA
	2839	AAUUCCAA CUGAUGA X GAA AGCGUCUG	CAGACGCUU UUGGAAUU
	2840	CAAUJCCA CUGAUGA X GAA AAGCGUCU	AGACGCUUU UGGAAUUG
	2841	UCAAUUCC CUGAUGA X GAA AAAGCGUC	GACGCUUUU GGAAUUGA
	2847	GUCUJUGUC CUGAUGA X GAA AUUCCAAA	UUUGGAAUU GACAAGAC
10	2863	UGUUUUUGC CUGAUGA X GAA AGUCCUG	CAGCGACUU GCAAAACA
	2874	UUGACGGC CUGAUGA X GAA ACUGUUUU	AAAACAGUA GCCGUCAA
	2880	AACAUCUU CUGAUGA X GAA ACGGCUAC	GUAGCCGUC AAGAUGUU
	2888	CUUCUUUC CUGAUGA X GAA ACAUCUUG	CAAGAUGUU GAAAGAAG
	2917	GAGGGCUC CUGAUGA X GAA AUGCUCGC	GCGAGCAUC GAGCCCUC
15	2925	UCAGACAU CUGAUGA X GAA AGGGCUCG	CGAGCCCUC AUGUCUGA
	2930	UGAGUUCA CUGAUGA X GAA ACAUGAGG	CCUCAUGUC UGAACUCA
	2937	AGGAUCUU CUGAUGA X GAA AGUUCAGA	UCUGAACUC AAGAUCCU
	2943	UGGAUGAG CUGAUGA X GAA AUCUUGAG	CUCAAGAUC CUCAUCCA
	2946	AUGUGGAU CUGAUGA X GAA AGGAUCUU	AAGAUCCUC AUCCACAU
20	2949	CCAAUGUG CUGAUGA X GAA AUGAGGAU	AUCCUCAUC CACAUUUGG
	2955	UGGUGACC CUGAUGA X GAA AUGUGGAU	AUCCACAUU GGUCACCA
	2959	GAGAUGGU CUGAUGA X GAA ACCAAUGU	ACAUUJGGUC ACCAUCUC
	2965	CACAUUGA CUGAUGA X GAA AUGGUGAC	GUCACCAUC UCAAUGUG
	2967	ACCACAUU CUGAUGA X GAA AGAUGGGUG	CACCAUCUC AAUGUGGU
25	2982	GCGCCUAG CUGAUGA X GAA AGGUUCAC	GUGAACCUC CUAGGCCG
	2985	CAGGCGCC CUGAUGA X GAA AGGAGGUU	AACCUCCUA GGCGCCUG
	3013	CACCAUGA CUGAUGA X GAA AGGCCUC	GAGGGCCUC UCAUGGUG
	3015	AUCACCAU CUGAUGA X GAA AGAGGCC	GGGCCUCUC AUGGUGAU
	3024	AAUUCCAC CUGAUGA X GAA AUCACCAU	AUGGUGAUU GUGGAAUU
30	3032	ACUUGCAG CUGAUGA X GAA AUUCCACA	UGUGGAAUU CUGCAAGU

	3033 AACUUGCA CUGAUGA X GAA AAUCCAC	GUGGAAUUC UGCAAGUU
	3041 GGUUUCCA CUGAUGA X GAA ACUUGCAG	CUGCAAGUU UGGAAACC
	3042 AGGUUUCC CUGAUGA X GAA AACUUGCA	UGCAAGUU GGAAACCU
	3051 UAAGUUGA CUGAUGA X GAA AGGUUUCC	GGAAACCUA UCAACUUA
5	3053 AGUAAGUU CUGAUGA X GAA AUAGGUUU	AAACCUAUC AACUJACU
	3058 CCGUAAGU CUGAUGA X GAA AGUUGAU	UAUCAACUU ACUUACGG
	3059 CCCGUAAG CUGAUGA X GAA AAGUUGAU	AUCAACUUA CUUACGGG
	3062 UGCCCGU CUGAUGA X GAA AGUAAGUU	AACUUACUU ACGGGGCA
	3063 UUGCCCCG CUGAUGA X GAA AAGUAAGU	ACUUACUU CAAGGGCAA
10	3083 AGGGAACA CUGAUGA X GAA AUUCAUU	AAAUGAAUU UGUUCCCU
	3084 UAGGGAAC CUGAUGA X GAA AAUCAUU	AAUGAAUU GUUCCCUA
	3087 UUAUAGGG CUGAUGA X GAA ACAAAUUC	GAAUUJGUU CCCUAUAA
	3088 CUUAUAGG CUGAUGA X GAA AACAAAUU	AAUUUGUUC CCUUAAG
	3092 UGCUCUUA CUGAUGA X GAA AGGGAACA	UGUUCCUA UAAGAGCA
15	3094 UUUGCUCU CUGAUGA X GAA AUAGGGAA	UUCCCUAUA AGAGCAAA
	3113 CCUGGCGG CUGAUGA X GAA AGCGUGCC	GGCACGCUU CCGCCAGG
	3114 CCCUGGCG CUGAUGA X GAA AAGCGUGC	GCACGCUUC CGCCAGGG
	3131 CCCCAACG CUGAUGA X GAA AGUCCUUG	CAAGGACUA CGUUGGGG
	3135 AGCUCCCC CUGAUGA X GAA ACGUAGUC	GACUACGUU GGGGAGCU
20	3144 UCCACGGA CUGAUGA X GAA AGCUCCCC	GGGGAGCUC UCCGUGGA
	3146 GAUCCACG CUGAUGA X GAA AGAGCUCC	GGAGCUCUC CGUGGAUC
	3154 UCUUUUCA CUGAUGA X GAA AUCCACGG	CCGUGGAUC UGAAAAGA
	3167 UGCUGUCC CUGAUGA X GAA AGCGUCUU	AAGACGCUU GGACAGCA
	3177 CUGCUGGU CUGAUGA X GAA AUGCUGUC	GACAGCAUC ACCAGCAG
25	3194 AGCUGGCA CUGAUGA X GAA AGCUCUGG	CCAGAGCUC UGCCAGCU
	3203 CAAAGCCU CUGAUGA X GAA AGCUGGCA	UGCCAGCUC AGGCUUUG
	3209 CCUCAACA CUGAUGA X GAA AGCCUGAG	CUCAGGCUU UGUUGAGG
	3210 UCCUCAAC CUGAUGA X GAA AAGCCUGA	UCAGGCUUU GUUGAGGA
	3213 UUCUCCUC CUGAUGA X GAA ACAAAGCC	GGCUUJGUU GAGGAGAA
30	3224 CACUGAGC CUGAUGA X GAA AUUUCUCC	GGAGAAAUC GCUCAGUG

	3228	ACAUCACU CUGAUGA X GAA AGCGAUUU	AAAUCGCUC AGUGAUGU
	3237	UCUUCCUC CUGAUGA X GAA ACAUCACU	AGUGAUGUA GAGGAAGA
	3253	UUCUUCAG CUGAUGA X GAA AGCUUCUU	AAGAACGUU CUGAAGAA
	3254	GUUCUUCA CUGAUGA X GAA AAGCUUCU	AGAACGUUC UGAAGAAC
5	3266	AGUCCUUG CUGAUGA X GAA ACAGUUCU	AGAACUGUA CAAGGACU
	3275	AGGUCAGG CUGAUGA X GAA AGUCCUUG	CAAGGACUU CCUGACCU
	3276	AAGGUCAG CUGAUGA X GAA AAGUCCUU	AAGGACUUC CUGACCUU
	3284	GAUGCUCU CUGAUGA X GAA AGGUCAGG	CCUGACCUU GGAGCAUC
	3292	ACAGAUGA CUGAUGA X GAA AUGCUCCA	UGGAGCAUC UCAUCUGU
10	3294	UAACAGAU CUGAUGA X GAA AGAUGCUC	GAGCAUCUC AUCUGUUA
	3297	CUGUAACA CUGAUGA X GAA AUGAGAUG	CAUCUCAUC UGUUACAG
	3301	GAAGCUGU CUGAUGA X GAA ACAGAUGA	UCAUCUGUU ACAGCUUC
	3302	GGAAGCUG CUGAUGA X GAA AACAGAUG	CAUCUGUUA CAGCUUCC
	3308	CCACUUGG CUGAUGA X GAA AGCUGUAA	UUACAGCUU CCAAGUGG
15	3309	GCCACUUG CUGAUGA X GAA AAGCUGUA	UACAGCUUC CAAGUGGC
	3319	CAUGCCCU CUGAUGA X GAA AGCCACUU	AAGUGGCUA AGGGCAUG
	3332	AUGCCAAG CUGAUGA X GAA ACUCCAUG	CAUGGAGUU CUUGGCAU
	3333	GAUGCCAA CUGAUGA X GAA AACUCCAU	AUGGAGUUC UUGGCAUC
	3335	UUGAUGCC CUGAUGA X GAA AGAACUCC	GGAGUUCUU GGCAUCAA
20	3341	ACUJUCCUU CUGAUGA X GAA AUGCCAAG	CUUGGCAUC AAGGAAGU
	3352	CCUGUGGA CUGAUGA X GAA ACACUUCC	GGAAGUGUA UCCACAGG
	3354	UCCCUGUG CUGAUGA X GAA AUACACUU	AAGUGUAUC CACAGGGA
	3381	GAUAGGAG CUGAUGA X GAA AUGUUUCG	CGAAACAUU CUCCUAUC
	3382	CGAUAGGA CUGAUGA X GAA AAUGUUUC	GAAACAUUC UCCUAUCG
25	3384	UCCGAUAG CUGAUGA X GAA AGAAUGUU	AACAUUCUC CUAUCGGA
	3387	IUCUCCGA CUGAUGA X GAA AGGAGAAU	AUUCUCCUA UC GGAGAAGA
	3389	UCUUCUCC CUGAUGA X GAA AUAGGAGA	UCUCCUAUC GGAGAAGA
	3405	CAGAUCUU CUGAUGA X GAA ACCACAUU	AAUGUGGUU AAGAUCUG
	3406	ACAGAUCU CUGAUGA X GAA AACCACAU	AUGUGGUUA AGAUCUGU
30	3411	AAGUCACA CUGAUGA X GAA AUCUUAAC	GUUAAGAUC UGUGACUU

3419	CCAAGCCG CUGAUGA X GAA AGUCACAG	CUGUGACUU CGGCUUGG
3420	GCCAAGCC CUGAUGA X GAA AAGUCACA	UGUGACUUC GGCUUGGC
3425	CCCAGGCC CUGAUGA X GAA AGCCGAAG	CUUCGGCUU GGCCCCGG
3438	UCUUUAUA CUGAUGA X GAA AUGUCCCG	CGGGACAUU UAUAAAAGA
5	3439 GUCUUUAU CUGAUGA X GAA AAUGUCCC	GGGACAUU AUAAAGAC
	3440 GGUCUUUA CUGAUGA X GAA AAAUGUCC	GGACAUUUA UAAAGACC
	3442 CGGGUCUU CUGAUGA X GAA AUAAAUGU	ACAUUUAUA AAGACCCG
	3454 UCUGACAU CUGAUGA X GAA AUCCGGGU	ACCCGGAUU AUGUCAGA
	3455 UUCUGACA CUGAUGA X GAA AAUCCGGG	CCCGGAUUA UGUCAGAA
10	3459 CCUUUUCU CUGAUGA X GAA ACAUAAUC	GAUUAUGUC AGAAAAGG
	3480 UUCAAAGG CUGAUGA X GAA AGUCGGGC	GCCCGACUC CCUUJUGAA
	3484 CCACUUCA CUGAUGA X GAA AGGGAGUC	GACUCCUU UGAAGUGG
	3485 UCCACUUC CUGAUGA X GAA AAGGGAGU	ACUCCUUU GAAGUGGA
	3510 CUGUAAA CUGAUGA X GAA AUGGUUUC	GAAACCAUU UUUGACAG
15	3511 UCUGUCAA CUGAUGA X GAA AAUGGUUU	AAACCAUUU UUGACAGA
	3512 CUCUGUCA CUGAUGA X GAA AAAUGGUU	AACCAUUUU UGACAGAG
	3513 ACUCUGUC CUGAUGA X GAA AAAAUGGU	ACCAUUUUU GACAGAGU
	3522 AUUGUGUA CUGAUGA X GAA ACUCUGUC	GACAGAGUA UACACAAU
	3524 GAAUUGUG CUGAUGA X GAA AUACUCUG	CAGAGUAUA CACAAUUC
20	3531 UCGCUCUG CUGAUGA X GAA AUUGUGUA	UACACAAUU CAGAGCGA
	3532 AUCGCUCU CUGAUGA X GAA AAUUGUGU	ACACAAUUC AGAGCGAU
	3548 CACCGAAA CUGAUGA X GAA ACCACACA	UGUGUGGUUC UUUCGGUG
	3550 CACACCGA CUGAUGA X GAA AGACCACA	UGUGGGUCUU UCGGUGUG
	3551 ACACACCG CUGAUGA X GAA AAGACCAC	GUGGUCUUU CGGUGUGU
25	3552 AACACACC CUGAUGA X GAA AAAGACCA	UGGUCUUUC GGUGUGUU
	3560 CCCAGAGC CUGAUGA X GAA ACACACCG	CGGUGUGUU GCUCUGGG
	3564 AUUUCCCA CUGAUGA X GAA AGCAACAC	GUGUUGCUC UGGGAAAU
	3573 AAGGAAAA CUGAUGA X GAA AUUUCCCA	UGGGAAUA UUUUCCUU
	3575 CUAAGGAA CUGAUGA X GAA AUAUUUC	GGAAAUUUU UUCCUUAG
30	3576 CCUAAGGA CUGAUGA X GAA AAUAUUUC	GAAAUUUU UCCUUAGG

	3577	ACCUAAGG CUGAUGA X GAA AAAUAUU	AAAUAUUU CCUUAGGU
	3578	CACCBAAG CUGAUGA X GAA AAAUAUU	AAUAUUUUC CUUAGGUG
	3581	AGGCACCU CUGAUGA X GAA AGGAAAAU	AUUUUCUU AGGUGCCU
	3582	GAGGCACC CUGAUGA X GAA AAGGAAAA	UUUUCUUA GGUGCCUC
5	3590	GGUAUGGG CUGAUGA X GAA AGGCACCU	AGGUGCCUC CCCAUACC
	3596	CCCCAGGG CUGAUGA X GAA AUGGGAG	CUCCCCBAUA CCCUGGGG
	3606	UCAAUCUU CUGAUGA X GAA ACCCCAGG	CCUGGGGUC AAGAUUGA
	3612	UCUUCAUC CUGAUGA X GAA AUCUJGAC	GUCAAGAUU GAUGAAGA
	3623	UCCUACAA CUGAUGA X GAA AUUCUUCA	UGAAGAAUU UUGUAGGA
10	3624	CUCCUACA CUGAUGA X GAA AAUUCUUC	GAAGAAUU UGUAGGAG
	3625	UCUCCUAC CUGAUGA X GAA AAAUUCUU	AAGAAUUUU GUAGGAGA
	3628	CAAUCUCC CUGAUGA X GAA ACAAAAUU	AAUUUJGUA GGAGAUUG
	3635	CUUCUUUC CUGAUGA X GAA AUCUCCUA	UAGGAGAUU GAAAGAAG
	3649	CCGCAUUC CUGAUGA X GAA AGUUCCUU	AAGGAACUA GAAUGCAG
15	3661	GUAGUCAG CUGAUGA X GAA AGCCCGCA	UGCGGGCUC CUGACUAC
	3668	GGGUAGUG CUGAUGA X GAA AGUCAGGA	UCCUGACUA CACUACCC
	3673	UUCUGGGG CUGAUGA X GAA AGUGUAGU	ACUACACUA CCCCAGAA
	3686	UGGUCUGG CUGAUGA X GAA ACAUUUCU	AGAAAUGUA CCAGACCA
	3734	CUGAAAAC CUGAUGA X GAA AGGGUCUC	GAGACCCUC GUUUUCAG
20	3737	ACUCUGAA CUGAUGA X GAA ACGAGGGU	ACCCUCGUU UUCAGAGU
	3738	AACUCUGA CUGAUGA X GAA AACGAGGG	CCCUCGUUU UCAGAGUU
	3739	CAACUCUG CUGAUGA X GAA AAACGAGG	CCUCGUUUU CAGAGUUG
	3740	CCAACUCU CUGAUGA X GAA AAAACGAG	CUCGUUUUC AGAGUUGG
	3746	GCUCCACC CUGAUGA X GAA ACUCUGAA	UUCAGAGUU GGUGGAGC
25	3757	GUUUCCCA CUGAUGA X GAA AUGCUCCA	UGGAGCAUU UGGGAAAC
	3758	GGUUUCCC CUGAUGA X GAA AAUGCUCC	GGAGCAUUU GGGAAACC
	3768	GCUUGCAG CUGAUGA X GAA AGGUUUCC	GGAAACCUC CUGCAAGC
	3803	GAACAAUA CUGAUGA X GAA AGUCUJUG	CAAAGACUA UAUJGUUC
	3805	AAGAACAA CUGAUGA X GAA AUAGUCUU	AAGACUAUA UUGUUCUU
30	3807	GGAAGAAC CUGAUGA X GAA AUAUAGUC	GACUUAUU GUUCUUCC

3810	AUUGGAAG CUGAUGA X GAA ACAAUUA	UAUAUUGUU CUUCCAAU
3811	CAUUGGAA CUGAUGA X GAA AACAAUAU	AUAUUGUUC UUCCAAUG
3813	GACAUUGG CUGAUGA X GAA AGAACAAU	AUJGUUCUU CCAAUGUC
3814	UGACAUUG CUGAUGA X GAA AAGAACAA	UUGUUCUUC CAAUGUCA
5	3821 GUGUCUCU CUGAUGA X GAA ACAUUGGA	UCCAAUGUC AGAGACAC
	3847 GAGUCCAG CUGAUGA X GAA AUCCUCUU	AAGAGGAUU CUGGACUC
	3848 AGAGUCCA CUGAUGA X GAA AAUCCUCU	AGAGGAUUC UGGACUCU
	3855 GGCAGGGG CUGAUGA X GAA AGUCCAGA	UCUGGACUC UCCTUGCC
	3857 UAGGCAGG CUGAUGA X GAA AGAGUCCA	UGGACUCUC CCUGCCUA
10	3865 AGGUGAGG CUGAUGA X GAA AGGCAGGG	CCCUGCCUA CCUCACCU
	3869 AAACAGGU CUGAUGA X GAA AGGUAGGC	GCCUACCUC ACCUGUUU
	3876 AUACAGGA CUGAUGA X GAA ACAGGUGA	UCACCUGUU UCCUGUAU
	3877 CAUACAGG CUGAUGA X GAA AACAGGUG	CACCUGUUU CCUGUAUG
	3878 CCAUACAG CUGAUGA X GAA AAACAGGU	ACCUGUUUC CUGUAUGG
15	3883 UUCCUCCA CUGAUGA X GAA ACAGGAAA	UUUCCUGUA UGGAGGAA
	3914 CAUAAUGG CUGAUGA X GAA AUUUGGGG	CCCCAAAUU CCAUUAUG
	3915 UCAUAAUG CUGAUGA X GAA AAUUJUGGG	CCCAAAUUC CAUUAUGA
	3919 GUJGUCAU CUGAUGA X GAA AUGGAAU	AAUUCCAUU AUGACAAC
	3920 UGUJGUCA CUGAUGA X GAA AAUGGAAU	AUUCCAUUA UGACAACA
20	3939 UAAUGACU CUGAUGA X GAA AUUCCUGC	GCAGGAAUC AGUCAUUA
	3943 GAGAUAAU CUGAUGA X GAA ACUGAUJC	GAAUCAGUC AUUAUCUC
	3946 CUGGAGAU CUGAUGA X GAA AUGACUGA	UCAGUCAUU AUCUCCAG
	3947 UCUGGAGA CUGAUGA X GAA AAUGACUG	CAGUCAUUA UCUCAGA
	3949 GUUCUGGA CUGAUGA X GAA AUAAUGAC	GUCAUUAUC UCCAGAAC
25	3951 CUGUUCUG CUGAUGA X GAA AGAUAAUG	CAUUAUCUC CAGAACAG
	3961 CUUUCGCU CUGAUGA X GAA ACUGUUCU	AGAACAGUA AGCGAAAG
	3987 AAUGUUUU CUGAUGA X GAA ACACUCAC	GUGAGUGUA AAAACAUU
	3995 UAUCUUCA CUGAUGA X GAA AUGUUUUU	AAAAACAUU UGAAGAUUA
	3996 AUAUCUUC CUGAUGA X GAA AAUGUUUU	AAAACAUU GAAGAUAU
30	4003 CAAUGGGA CUGAUGA X GAA AUCUUCAA	UUGAAGAUUA UCCCAUUG

4005	UCCAAUGG CUGAUGA X GAA AUAUCUUC	GAAGAUUAUC CCAUUGGA
4010	GUUCCUCC CUGAUGA X GAA AUGGGAUA	UAUCCCAUU GGAGGAAC
4026	AUCACUUU CUGAUGA X GAA ACUUCUGG	CCAGAAGUA AAAGUGAU
4035	UCAUCUGG CUGAUGA X GAA AUCACUUU	AAAGUGAUC CCAGAUGA
5	4068 GAUGCAAG CUGAUGA X GAA ACCAUCCC	GGGAUGGUC CUUGCAUC
	4071 UCUGAUGC CUGAUGA X GAA AGGACCAU	AUGGUCCUU GCAUCAGA
	4076 GCUCUUCU CUGAUGA X GAA AUGCAAGG	CCUUGCAUC AGAAGAGC
	4093 GUCUUCCA CUGAUGA X GAA AGUUUUCA	UGAAAACUC UGGAAGAC
	4112 AUGGAGAU CUGAUGA X GAA AUUUGUUC	GAACAAAUU AUCUCCAU
10	4113 GAUGGAGA CUGAUGA X GAA AAUJUGUU	AACAAAUA UCUCCAUC
	4115 AAGAUGGA CUGAUGA X GAA AUAAUJJUG	CAAUUAUC UCCAUCUU
	4117 AAAAGAUG CUGAUGA X GAA AGAUAAUU	AAUUAUCUC CAUCUUUU
	4121 CACCAAAA CUGAUGA X GAA AUGGAGAU	AUCUCCAU C UUJUGGUG
	4123 UCCACCAA CUGAUGA X GAA AGAUGGAG	CUCCAUCUU UUGGUGGA
15	4124 UUCCACCA CUGAUGA X GAA AAGAUGGA	UCCAUCUUU UGGUGGAA
	4125 AUUCCACC CUGAUGA X GAA AAAGAUGG	CCAUCUUU GGUGGAAU
	4144 CCUGCUUU CUGAUGA X GAA ACUGGGCA	UGCCCAGUA AAAGCAGG
	4157 AGGCCACA CUGAUGA X GAA ACUCCCUG	CAGGGAGUC UGUGGCCU
	4166 AGCCUUCC CUGAUGA X GAA AGGCCACA	UGUGGCCUC GGAAGGCU
20	4175 UCUGGUJG CUGAUGA X GAA AGCCUJCC	GGAAGGCUC CAACCAGA
	4193 CAGACUGG CUGAUGA X GAA AGCCACUG	CAGUGGCUA CCAGUCUG
	4199 GAUACCCA CUGAUGA X GAA ACUGGUAG	CUACCAGUC UGGGUAU
	4205 CUGAGUGA CUGAUGA X GAA ACCCAGAC	GUCUGGGUA UCACUCAG
	4207 AUCUGAGU CUGAUGA X GAA AUACCCAG	CUGGGUAUC ACUCAGAU
25	4211 UGUCAUCU CUGAUGA X GAA AGUGAUAC	GUAUCACUC AGAUGACA
	4235 CGCUGGAG CUGAUGA X GAA ACACGGUG	CACCGUGUA CUCCAGCG
	4238 CGUCGCUG CUGAUGA X GAA AGUACACG	CGUGUACUC CAGCGACG
	4257 AUCUUUAA CUGAUGA X GAA AGUCCUGC	GCAGGACUU UUAAAGAU
	4258 CAUCUUUA CUGAUGA X GAA AAGUCCUG	CAGGACUUU UAAAGAUG
30	4259 CCAUCUU CUGAUGA X GAA AAAGUCCU	AGGACUUU AAAGAUGG

	4260 ACCAUCUU CUGAUGA X GAA AAAAGUCC	GGACUUUUA AAGAUGGU
	4281 UCAGCGUG CUGAUGA X GAA ACUGCAGC	GCUGCAGUU CACGCUGA
	4282 GUCAGCGU CUGAUGA X GAA AACUGCAG	CUGCAGUUC ACGCUGAC
	4292 UGGUCCCU CUGAUGA X GAA AGUCAGCG	CGCUGACUC AGGGACCA
5	4311 CAGGAGGU CUGAUGA X GAA AGCUGCAG	CUGCAGCUC ACCUCCUG
	4316 UUAAAACAG CUGAUGA X GAA AGGUGAGC	GCUCACCUC CUGUUUAA
	4321 UCCAUUUA CUGAUGA X GAA ACAGGAGG	CCUCCUGUU UAAAUGGA
	4322 UUCCAUUU CUGAUGA X GAA AACAGGAG	CUCCUGUUU AAAUGGAA
	4323 CUUCCAUU CUGAUGA X GAA AAACAGGA	UCCUGUUUA AAUGGAAG
10	4336 CGGGACAG CUGAUGA X GAA ACCACUUC	GAAGUGGUC CUGUCCCG
	4341 GGAGCCGG CUGAUGA X GAA ACAGGACC	GGUCCUGUC CCGGCUCC
	4348 UGGGGCG CUGAUGA X GAA AGCCGGGA	UCCCAGCUC CGCCCCCA
	4360 AUUUCCAG CUGAUGA X GAA AGUUGGGG	CCCCAACUC CUGGAAAU
	4369 UCUCUCGU CUGAUGA X GAA AUUCCAG	CUGGAAAC CCGAGAGA
15	4387 GAAAAUCU CUGAUGA X GAA AGCAGCAC	GUGCUGCUU AGAUUUUC
	4388 UGAAAAAUC CUGAUGA X GAA AAGCAGCA	UGCUGCUUA GAUUUUC
	4392 CACUUGAA CUGAUGA X GAA AUCUAAGC	GCUUAGAUU UUCAAGUG
	4393 ACACUUGA CUGAUGA X GAA AAUCUAAG	CUUAGAUUU UCAAGUGU
	4394 AACACUUG CUGAUGA X GAA AAAUCUAA	UUAGAUUUU CAAGUGUU
20	4395 CAACACUU CUGAUGA X GAA AAAUCUA	UAGAUUUUC AAGUGUUG
	4402 GAAAGAAC CUGAUGA X GAA ACACUUGA	UCAAGUGUU GUUCUUUC
	4405 GUGGAAAG CUGAUGA X GAA ACAACACU	AGUGUUGUU CUUCCAC
	4406 GGUGGAAA CUGAUGA X GAA AACAAACAC	GUGUUGUUC UUCCACC
	4408 GUGGUGGA CUGAUGA X GAA AGAACAAAC	GUUGUUCUU UCCACCAC
25	4409 GGUGGGGG CUGAUGA X GAA AAGAACAA	UUGUUCUUU CCACCACC
	4410 GGGUGGGUG CUGAUGA X GAA AAAGAACAA	UGUUCUUUC CACCACCC
	4425 AAUGUGGC CUGAUGA X GAA ACUUCGGG	CCGGAAGUA GCCACAUU
	4433 GAAAAUCA CUGAUGA X GAA AUGUGGCC	AGCCACAUU UGAUUUUC
	4434 UGAAAAAUC CUGAUGA X GAA AAUGUGGC	GCCACAUUU GAUUUUC
30	4438 AAAUGAA CUGAUGA X GAA AUCAAAG	CAUUGAUU UUCAUUUU

4439	AAAAAUGA CUGAUGA X GAA AAUCAAAU	AUUJUGAUUU UCAUUUUU
4440	CAAAAAUG CUGAUGA X GAA AAAUCAAA	UUUGAUUUU CAUUUUUG
4441	CCAAAAAU CUGAUGA X GAA AAAUCAA	UUGAUUUUC AUUUUUGG
4444	CCUCCAAA CUGAUGA X GAA AUGAAAAU	AUUUUCAUU UUUGGAGG
5	4445 UCCUCCAA CUGAUGA X GAA AAUGAAAA	UUUUCAUUU UGGAGGA
	4446 CUCCUCCA CUGAUGA X GAA AAAUGAAA	UUUCAUUUU UGGAGGAG
	4447 CCUCCUCC CUGAUGA X GAA AAAUGAA	UUCAUUUUU GGAGGAGG
	4461 UGCAGUCU CUGAUGA X GAA AGGUCCU	AGGGACCUC AGACUGCA
	4477 CUGAGGAC CUGAUGA X GAA AGCUCCUU	AAGGAGCUU GUCCUCAG
10	4480 GCCCUGAG CUGAUGA X GAA ACAAGCUC	GAGCUUGUC CUCAGGGC
	4483 AAUGCCCU CUGAUGA X GAA AGGACAAG	CUUGUCCUC AGGGCAUU
	4491 UCUCUGGA CUGAUGA X GAA AUGCCCUG	CAGGGCAUU UCCAGAGA
	4492 UUCUCUGG CUGAUGA X GAA AAUGCCU	AGGGCAUUU CCAGAGAA
	4493 CUUCUCUG CUGAUGA X GAA AAAUGCCC	GGGCAUUUC CAGAGAAG
15	4525 GUAGAGUC CUGAUGA X GAA ACACAUUC	GAAUGUGUU GACUCUAC
	4530 AGAGAGUA CUGAUGA X GAA AGUCAACA	UGUUGACUC UACUCUCU
	4532 AAAGAGAG CUGAUGA X GAA AGAGUCAA	UUGACUCUA CUCUCUUU
	4535 GGAAAAGA CUGAUGA X GAA AGUAGAGU	ACUCUACUC UCUUUUCC
	4537 AUGGAAAA CUGAUGA X GAA AGAGUAGA	UCUACUCUC UUUUCCAU
20	4539 GAAUGGAA CUGAUGA X GAA AGAGAGUA	UACUCUCUU UUCCAUUC
	4540 UGAAUGGA CUGAUGA X GAA AAGAGAGU	ACUCUCUUU UCCAUUCA
	4541 AUGAAUGG CUGAUGA X GAA AAAGAGAG	CUCUCUUUU CCAUCAU
	4542 AAUGAAUG CUGAUGA X GAA AAAAGAGA	UCUCUUUUJC CAUUCAUU
	4546 UUUAAAUG CUGAUGA X GAA AUGGAAAA	UUUUCCAUU CAUUUAAA
25	4547 UUUUAAA CUGAUGA X GAA AAUGGAAA	UUUCCAUUC AUUUAAAA
	4550 GACUUUUA CUGAUGA X GAA AUGAAUGG	CCAUCAUU UAAAAGUC
	4551 GGACUUUU CUGAUGA X GAA AAUGAAUG	CAUUCAUUU AAAAGUCC
	4552 AGGACUUU CUGAUGA X GAA AAAUGAAU	AUUCAUUUA AAAGUCCU
	4558 UUAAUAG CUGAUGA X GAA ACUUUUAA	UUAAAAGUC CUAAUAA
30	4561 ACAUUUA CUGAUGA X GAA AGGACUUU	AAAGUCCUA UAUAAUGU

	4563	GCACAUUA CUGAUGA X GAA AUAGGACU	AGUCCUAUA UAAUGUGC
	4565	GGGCACAU CUGAUGA X GAA AUAUAGGA	UCCUAUUA AUGUGCCC
	4583	GGUAGUGA CUGAUGA X GAA ACCACAGC	GCUGUGGUUC UCACUACC
	4585	CUGGUAGU CUGAUGA X GAA AGACCACA	UGUGGUCUC ACUACCAAG
5	4589	UUAACUGG CUGAUGA X GAA AGUGAGAC	GUCUCACUA CCAGUUAA
	4595	UUUGCUUU CUGAUGA X GAA ACUGGUAG	CUACCAGUU AAAGCAAA
	4596	UUJUGCUU CUGAUGA X GAA AACUGGUAA	UACCAGUUA AAGCAAAA
	4609	GUGUUJUGA CUGAUGA X GAA AGUCUUUU	AAAAGACUU UCAAACAC
	4610	CGUGUUJUG CUGAUGA X GAA AAGUCUUU	AAAGACUUU CAAACACG
10	4611	ACGUGUUU CUGAUGA X GAA AAAGUCUU	AAGACUUUC AAACACGU
	4625	GGAGGACA CUGAUGA X GAA AGUCCACG	CGUGGACUC UGUCCUCC
	4629	UCUUGGAG CUGAUGA X GAA ACAGAGUC	GACUCUGUC CUCCAAGA
	4632	ACUUCUUG CUGAUGA X GAA AGGACAGA	UCUGUCCUC CAAGAACGU
	4654	GUUUCACA CUGAUGA X GAA AGGUGCCG	CGGCACCUUC UGUGAAAC
15	4668	GCCCAUUC CUGAUGA X GAA AUCCAGUU	AACUGGAUC GAAUGGGC
	4683	AACACACA CUGAUGA X GAA AGCAUUGC	GCAAUGCUU UGUGUGUU
	4684	CAACACAC CUGAUGA X GAA AAGCAUUG	CAAUGCUU GUGUGUUG
	4691	CCAUCUC CUGAUGA X GAA ACACACAA	UUGUGUGUU GAGGAUGG
	4709	GGCCCUGG CUGAUGA X GAA ACAUCUCA	UGAGAUGUC CCAGGGCC
20	4722	GGUAGACA CUGAUGA X GAA ACUCGGCC	GGCCGAGUC UGUCUACC
	4726	CCAAGGUA CUGAUGA X GAA ACAGACUC	GAGUCUGUC UACCUUGG
	4728	CUCCAAGG CUGAUGA X GAA AGACAGAC	GUCUGUCUA CCUUGGAG
	4732	AAGCCUCC CUGAUGA X GAA AGGUAGAC	GUCUACCUU GGAGGCCUU
	4740	CCUCCACA CUGAUGA X GAA AGCCUCCA	UGGAGGCCUU UGUGGAGG
25	4741	UCCUCCAC CUGAUGA X GAA AAGCCUCC	GGAGGCCUUU GUGGAGGA
	4758	UUGGCUCA CUGAUGA X GAA AGCCCGCA	UGCGGGCUA UGAGCCAA
	4771	CCACACUU CUGAUGA X GAA ACACUUGG	CCAAGUGUU AAGUGUGG
	4772	CCCACACU CUGAUGA X GAA AACACUUG	CAAGUGUU AAGUGUGGG
	4811	CUCCGAGC CUGAUGA X GAA ACUUGCGC	GCGCAAGUC GCUCGGAG
30	4815	CGCUCUCC CUGAUGA X GAA AGCGACUU	AAGUCGCUC GGAGAGCG

4826	CAGGCCUCC CUGAUGA X GAA ACCGCUCU	AGAGCGGUU GGAGCCUG
4844	GCCAGCAC CUGAUGA X GAA AUGCAUCU	AGAUGCAUU GUGCUGGC
4854	CUCCACCA CUGAUGA X GAA AGCCAGCA	UGCUGGCUC UGGUGGAG
4870	CAGGCCAC CUGAUGA X GAA AGCCCACC	GGUGGGCUU GUGGCCUG
5	4880 CGUUUCCU CUGAUGA X GAA ACAGGCCA	UGGCCUGUC AGGAAACG
4908	CAAAACCA CUGAUGA X GAA ACCCUGCC	GGCAGGGUU UGGUUUUG
4909	CCAAAACC CUGAUGA X GAA AACCCUGC	GCAGGGUUU GGUUUJUGG
4913	CCUUCCAA CUGAUGA X GAA ACCAAACC	GGUUUGGUU UUGGAAGG
4914	ACCUUCCA CUGAUGA X GAA AACCAAAC	GUUUGGUUU UGGAAGGU
10	4915 AACCUUCC CUGAUGA X GAA AAACCAAA	UUUGGUUUU GGAAGGUU
4923	AGCACGCA CUGAUGA X GAA ACCUUCCA	UGGAAGGUU UGCGUGCU
4924	GAGCACGC CUGAUGA X GAA AACCUUCC	GGAAGGUUU GCGUGCUC
4932	ACUGUGAA CUGAUGA X GAA AGCACGCA	UGCGUGCUC UUCACAGU
4934	CGACUGUG CUGAUGA X GAA AGAGCACG	CGUGCUCUU CACAGUCG
15	4935 CCGACUGU CUGAUGA X GAA AAGAGCAC	GUGCUCUUC ACAGUCGG
4941	UGUAACCC CUGAUGA X GAA ACUGUGAA	UUCACAGUC GGGUUACA
4946	UCGCCUGU CUGAUGA X GAA ACCCGACU	AGUCGGGUU ACAGCGA
4947	CUCGCCUG CUGAUGA X GAA AACCCGAC	GUCGGGUUA CAGGCGAG
4957	CCACAGGG CUGAUGA X GAA ACUCGCCU	AGGCGAGUU CCCUGUGG
20	4958 GCCACAGG CUGAUGA X GAA AACUCGCC	GGCGAGUUC CCUGUGGC
4969	GAGUAGGA CUGAUGA X GAA ACGCCACA	UGUGGCGUU UCCUACUC
4970	GGAGUAGG CUGAUGA X GAA AACGCCAC	GUGGCGUUU CCUACUCC
4971	AGGAGUAG CUGAUGA X GAA AAACGCCA	UGGCGUUUC CUACUCCU
4974	AUUAGGAG CUGAUGA X GAA AGGAAACG	CGUUUCCUA CUCCUAU
25	4977 CUCAUUAG CUGAUGA X GAA AGUAGGAA	UUCCUACUC CUAAUGAG
4980	ACUCUCAU CUGAUGA X GAA AGGAGUAG	CUACUCCUA AUGAGAGU
4989	CCGGAAGG CUGAUGA X GAA ACUCUCAU	AUGAGAGUU CCUUCGGG
4990	UCCGGAAG CUGAUGA X GAA AACUCUCA	UGAGAGUUC CUUCCGGA
4993	GAGUCCGG CUGAUGA X GAA AGGAACUC	GAGUUCCUU CCGGACUC
30	4994 AGAGUCCG CUGAUGA X GAA AAGGAACU	AGUUCCUUC CGGACUCU

5001	ACACGUAA CUGAUGA X GAA AGUCCGGA	UCCGGACUC UUACGUGU
5003	AGACACGU CUGAUGA X GAA AGAGUCCG	CGGACUCUU ACGUGUCU
5004	GAGACACG CUGAUGA X GAA AAGAGUCC	GGACUCUUA CGUGUCUC
5010	GGCCAGGA CUGAUGA X GAA ACACGUAA	UUACGUGUC UCCUGGCC
5	5012 CAGGCCAG CUGAUGA X GAA AGACACGU	ACGUGUCUC CUGGCCUG
5046	GAAGGAGC CUGAUGA X GAA AGCUGCAU	AUGCAGCUU GCUCUUC
5050	UGAGGAAG CUGAUGA X GAA AGCAAGCU	AGCUUGCUC CUUCCUCA
5053	AGAUGAGG CUGAUGA X GAA AGGAGCAA	UUGCUCUU CCUCAUCU
5054	GAGAUGAG CUGAUGA X GAA AAGGAGCA	UGCUCCUUC CUCAUCUC
10	5057 UGAGAGAU CUGAUGA X GAA AGGAAGGA	UCCUUCCUC AUCUCUCA
5060	GCCUGAGA CUGAUGA X GAA AUGAGGAA	UUCCUCAUC UCUCAGGC
5062	CAGCCUGA CUGAUGA X GAA AGAUGAGG	CCUCAUCUC UCAGGCUG
5064	CACAGCCU CUGAUGA X GAA AGAGAUGA	UCAUCUCUC AGGCUGUG
5076	UCUGAAUU CUGAUGA X GAA AGGCACAG	CUGUGCCUU AAUCAGA
15	5077 UUCUGAAU CUGAUGA X GAA AAGGCACA	UGUGCCUUA AUUCAGAA
5080	GUGUUCUG CUGAUGA X GAA AUUAAGGC	GCCUUAAUU CAGAACAC
5081	GGUGUUCU CUGAUGA X GAA AAUUAAGG	CCUUAAUUC AGAACACC
5105	CCUCUGCC CUGAUGA X GAA ACGUUCCU	AGGAACGUUC GGCAGAGG
5116	CCCGUCAG CUGAUGA X GAA AGCCUCUG	CAGAGGCUC CUGACGGG
20	5135 GUUCUCAC CUGAUGA X GAA AUUCUUCG	CGAAGAAUU GUGAGAAC
5156	GAAACCCU CUGAUGA X GAA AGUUUCUG	CAGAAACUC AGGGUUUC
5162	CCAGCAGA CUGAUGA X GAA ACCCUGAG	CUCAGGGUU UCUGCUGG
5163	CCCAGCAG CUGAUGA X GAA AACCCUGA	UCAGGGUUU CUGCUGGG
5164	ACCCAGCA CUGAUGA X GAA AAACCCUG	CAGGGUUUC UGCUGGGU
25	5203 AACCCUCA CUGAUGA X GAA ACCUGCCA	UGGCAGGUC UGAGGGUU
5211	UGACAGAG CUGAUGA X GAA ACCCUCAG	CUGAGGGUU CUCUGUCA
5212	UUGACAGA CUGAUGA X GAA AACCCUCA	UGAGGGUUC UCUGUCAA
5214	ACUUGACA CUGAUGA X GAA AGAACCCU	AGGGUUCUC UGUCAAGU
5218	CGCCACUU CUGAUGA X GAA ACAGAGAA	UUCUCUGUC AAGUGGCG
30	5229 UGAGCCUU CUGAUGA X GAA ACCGCCAC	GUGGCAGGU AAGGCUCA

	5236 ACCAGCCU CUGAUGA X GAA AGCCUUUA	UAAAGGCUC AGGCUGGU
	5247 AGAGGAAG CUGAUGA X GAA ACACCAGC	GCUGGGUUU CUUCCUCU
	5248 UAGAGGAA CUGAUGA X GAA AACACCAG	CUGGUGUUC UUCCUCUA
	5250 GAUAGAGG CUGAUGA X GAA AGAACACC	GGUGUUCUU CCUCUAUC
5	5251 AGAUAGAG CUGAUGA X GAA AAGAACAC	GUGUUCUUC CUCUAUCU
	5254 UGGAGAUA CUGAUGA X GAA AGGAAGAA	UUCUUCCUC UAUCUCCA
	5256 AGUGGAGA CUGAUGA X GAA AGAGGAAG	CUUCCUCUA UCUCACACU
	5258 GGAGUGGA CUGAUGA X GAA AUAGAGGA	UCCUCUAUC UCCACUCC
	5260 CAGGAGUG CUGAUGA X GAA AGAUAGAG	CUCUAUCUC CACUCCUG
10	5265 CCUGACAG CUGAUGA X GAA AGUGGAGA	UCUCCACUC CUGUCAGG
	5270 GGGGGCCU CUGAUGA X GAA ACAGGAGU	ACUCCUGUC AGGCCCCC
	5283 AUACUGAG CUGAUGA X GAA ACUUGGGG	CCCCAAGUC CUCAGUAU
	5286 AAAAUACU CUGAUGA X GAA AGGACUUG	CAAGUCCUC AGUAUUUU
	5290 AGCUAAAA CUGAUGA X GAA ACUGAGGA	UCCUCAGUA UUUUAGCU
15	5292 AAAGCUAA CUGAUGA X GAA AUACUGAG	CUCAGUAUU UUAGCUUU
	5293 CAAAGCUA CUGAUGA X GAA AAUACUGA	UCAGUAUUU UAGCUUJUG
	5294 ACAAAAGCU CUGAUGA X GAA AAAUACUG	CAGUAUUUU AGCUUUGU
	5295 CACAAAGC CUGAUGA X GAA AAAAUACU	AGUAUUUUA GCUUUGUG
	5299 AAGCCACA CUGAUGA X GAA AGCUAAAA	UUUUAGCUU UGUGGCUU
20	5300 GAAGCCAC CUGAUGA X GAA AAGCUAAA	UUUAGCUUU GUGGCUJC
	5307 CCAUCAGG CUGAUGA X GAA AGCCACAA	UUGUGGCUU CCUGAUGG
	5308 GCCAUCAG CUGAUGA X GAA AAGCCACA	UGUGGCUUC CUGAUGGC
	5325 CCAAUAAA CUGAUGA X GAA AUUUUUCU	AGAAAAAAUC UUAAUUGG
	5327 AACCAAUU CUGAUGA X GAA AGAUUUUU	AAAAAUCUU AAUUGGUU
25	5328 CAACCAAU CUGAUGA X GAA AAGAUUUU	AAAAAUCUA AUUGGUUG
	5331 AACCAAACC CUGAUGA X GAA AUUAAGAU	AUCUUAUUU GGUGGUU
	5335 AGCAAACC CUGAUGA X GAA ACCAAUUA	UAAUUGGUU GGUUUGCU
	5339 GGAGAGCA CUGAUGA X GAA ACCAACCA	UGGUUGGUU UGCUCUCC
	5340 UGGAGAGC CUGAUGA X GAA AACCAACC	GGUUGGUUU GCUCUCCA
30	5344 UAUCUGGA CUGAUGA X GAA AGCAAACC	GGUUGGCUC UCCAGAUA

	5346	AUUAUCUG CUGAUGA X GAA AGAGCAAA	UUUGCUCUC CAGAUAAU
	5352	CUAGUGAU CUGAUGA X GAA AUCUGGAG	CUCCAGAU AUCACUAG
	5355	UGGCUAGU CUGAUGA X GAA AUUAUCUG	CAGAUAAUC ACUAGCCA
	5359	AAUCUGGC CUGAUGA X GAA AGUGAUUA	UAAUCACUA GCCAGAUU
5	5367	AAUUUCGA CUGAUGA X GAA AUCUGGCC	AGCCAGAU UCGAAAUU
	5368	UAAAUCG CUGAUGA X GAA AAUCUGGC	GCCAGAUUU CGAAAUUA
	5369	GUAAUUUC CUGAUGA X GAA AAAUCUGG	CCAGAUUUC GAAAUUAC
	5375	AAAAAAAGU CUGAUGA X GAA AUUUCGAA	UUCGAAAUU ACUUUUUA
	5376	CUAAAAAG CUGAUGA X GAA AAUUCGGA	UCGAAAUUA CUUUUUAG
10	5379	CGGCUAAA CUGAUGA X GAA AGUAAUUU	AAAUAUUU UUUAGCCG
	5380	UCGGCUAA CUGAUGA X GAA AAGUAAUU	AAUUACUUU UUAGCCGA
	5381	CUCGGCUA CUGAUGA X GAA AAAGUAAU	AUUACUUUU UAGCCGAG
	5382	CCUCGGCU CUGAUGA X GAA AAAAGUAA	UUACUUUUU AGCCGAGG
	5383	ACCUCGGC CUGAUGA X GAA AAAAAGUA	UACUUUUUA GCCGAGGU
15	5392	GUUAUCAU CUGAUGA X GAA ACCUCGGC	GCCGAGGUU AUGAUAAAC
	5393	UGUUUAUCA CUGAUGA X GAA AACCUUCGG	CCGAGGUUA UGAUAACA
	5398	GUAGAUGU CUGAUGA X GAA AUCAUAAC	GUUAUGAU ACAUCUAC
	5403	AUACAGUA CUGAUGA X GAA AUGUUAUC	GAUACACAU UACUGUAU
	5405	GGAUACAG CUGAUGA X GAA AGAUGUUA	UAACAUCAU CUGUAUCC
20	5410	CUAAAGGA CUGAUGA X GAA ACAGUAGA	UCUACUGUA UCCUUUAG
	5412	UUCUAAAG CUGAUGA X GAA AUACAGUA	UACUGUAUC CUUUAGAA
	5415	AAAUCUA CUGAUGA X GAA AGGAUACA	UGUAUCCUU UAGAAUUU
	5416	AAAAUUCU CUGAUGA X GAA AAGGAUAC	GUAUCCUUU AGAAUUUU
	5417	AAAAAUUC CUGAUGA X GAA AAAGGAUA	UAUCCUUUA GAAUUUUUA
25	5422	UAGGUUAA CUGAUGA X GAA AUUCUAAA	UUUAGAAUU UUAACCUA
	5423	AUAGGUUA CUGAUGA X GAA AAUUCUAA	UUAGAAUUU UAACCUAU
	5424	UAUAGGUU CUGAUGA X GAA AAAUUCUA	UAGAAUUUU AACCUAUUA
	5425	UUAUAGGU CUGAUGA X GAA AAAAUUCU	AGAAUUUUUA ACCUUA
	5430	UAGUUUUA CUGAUGA X GAA AGGUUAAA	UUUAACCUA UAAAACUA
30	5432	CAUAGUUU CUGAUGA X GAA AUAGGUUA	UAACCUAUUA AACCUAUG

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5438	AGUAGACA CUGAUGA X GAA AGUUUUAU	AUAAAACUA UGUCUACU
5442	AACCAGUA CUGAUGA X GAA ACAUAGUU	AACUAUGUC UACUGGUU
5444	GAAACCAG CUGAUGA X GAA AGACAUAG	CUAUGUCUA CUGGUUUC
5450	CAGGCAGA CUGAUGA X GAA ACCAGUAG	CUACUGGUU UCUGCCUG
5 5451	ACAGGCAG CUGAUGA X GAA AACCAGUA	UACUGGUUU CUGCCUGU
5452	CACAGGCA CUGAUGA X GAA AAACCAGU	ACUGGUUUC UGCCUGUG

Where "X" represents stem II region of a HH ribozyme (Hertel et al., 1992 *Nucleic Acids Res.* 20 3252). The length of stem II may be \geq 2 base-pairs.

Table VII: Mouse flik-1 VEGF Receptor-Hairpin Ribozyme and Substrate Sequences

nt.	RP Ribozyme Sequence	Substrate
Posi-tion		
5 74	GGGACACA AGAA GGGCCC ACCAGAGAACACACGUUGGUACAUUACCUGUA	GGGCCCA GAC UGUGUCCC
8 8	GUUAUCC AGAA GGGGA ACCAGAGAACACACGUUGGUACAUUACCUGUA	UCCCGCA GCC GGGAUAAAC
10 5	GGAAUCGG AGAA GCCAGG ACCAGAGAACACACGUUGGUACAUUACCUGUA	CCUGGCC GAC CCGAUUCCC
11 0	UCCGGGGA AGAA GGUCAG ACCAGAGAACACACGUUGGUACAUUACCUGUA	CUGACCC GAU UCCGGCGGA
12 5	CGGCUGUC AGAA GUGUCC ACCAGAGAACACACGUUGGUACAUUACCUGUA	GGACACC GCU GACAGCCG
10 132	CCAGCCGC AGAA GUCAGC ACCAGAGAACACACGUUGGUACAUUACCUGUA	GCUGACA GCC GGGCUGGG
13 8	CUGGCUC AGAA GGGCU ACCAGAGAACACACGUUGGUACAUUACCUGUA	AGCCGCG GCU GGAGCCAG
17 5	CAGCGCAA AGAA GGGGAG ACCAGAGAACACACGUUGGUACAUUACCUGUA	CUCCCCG GUC UTGGCGCUG
19 9	GUCACAGA AGAA GUAUUG ACCAGAGAACACACGUUGGUACAUUACCUGUA	CCAUACC GCC UCUGUGAC
30 9	CACAGAGC AGAA GCUAGC ACCAGAGAACACACGUUGGUACAUUACCUGUA	GCUAGCU GUC GCUCUGUG
15 342	CCCACAGA AGAA GCUCCG ACCAGAGAACACACGUUGGUACAUUACCUGUA	CCGAGCC GCC UCUGUGGG
4 34	UGCAAGUA AGAA GAAGGG ACCAGAGAACACACGUUGGUACAUUACCUGUA	CCCUUCA GAU UACUUUGCA
63 0	UAGACAUU AGAA GUUGGAG ACCAGAGAACACACGUUGGUACAUUACCUGUA	CUCCACU GUU UAUGUCUA
65 5	GAUUGGUG AGAA GUAAUC ACCAGAGAACACACGUUGGUACAUUACCUGUA	GAUTACCA GAU CACCAUUC
73 9	CGACCCUC AGAA GGGGAU ACCAGAGAACACACGUUGGUACAUUACCUGUA	AUCCCCU GCC GAGGGUCG

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807	CUGUUCG	AGAA	CGAAC	ACCAGAGAAACACACAGUUUGGUACAUUACCU	GGAAACAG	UGUUCG	GAU	GGAAACAG	
920	ACAUGUA	AGAA	GAUAGG	ACCAGAGAAACACACAGUUUGGUACAUUACCU	GUCAUC	GUC	UAUCAU	GU	
1002	UUUUCUC	AGAA	GAUAGC	ACCAGAGAAACACACAGUUUGGUACAUUACCU	GUCAUC	GCC	GGAGAAA	GU	
1229	UCUTGAUC	AGAA	GUCCAC	ACCAGAGAAACACACAGUUUGGUACAUUACCU	GUGGACG	GAU	GAUCAGA	GU	
5	1365	AUAUCAGG	AGAA	GGGUAA	ACCAGAGAAACACACAGUUUGGUACAUUACCU	UUACCA	GCU	CCUGAU	GU
1556	UCUCACCG	AGAA	GGGGUG	ACCAGAGAAACACACAGUUUGGUACAUUACCU	CACCCA	GAU	CGGUGAGA	GU	
1629	UUGGGGUA	AGAA	GUGCAU	ACCAGAGAAACACACAGUUUGGUACAUUACCU	AUGCACA	GUC	UACGCCA	GU	
1687	UCUGUAGG	AGAA	GGCUUC	ACCAGAGAAACACACAGUUUGGUACAUUACCU	GAAGGCC	GCU	CCUACAGA	GU	
1696	UUGGGCGG	AGAA	GUAGGA	ACCAGAGAAACACACAGUUUGGUACAUUACCU	UCCUACA	GAC	CGGCCAA	GU	
10	1796	UUCCUUCA	AGAA	GGGCAU	ACCAGAGAAACACACAGUUUGGUACAUUACCU	AUGCCU	GAU	UGAAGGAA	GU
1950	GGCUGGGC	AGAA	GGUUGC	ACCAGAGAAACACACAGUUUGGUACAUUACCU	GCAACC	GCU	GCCCCAGCC	GU	
1953	GUUGGCUG	AGAA	GCAGGU	ACCAGAGAAACACACAGUUUGGUACAUUACCU	ACCUGGU	GCC	CAGCCAAC	GU	
1985	CAGUGCAC	AGAA	GGGACA	ACCAGAGAAACACACAGUUUGGUACAUUACCU	UGUCCU	GUU	GUGGCACUG	GU	
2055	CCCAUGUG	AGAA	GAUGUU	ACCAGAGAAACACACAGUUUGGUACAUUACCU	AACAU	GCG	CACAU	GG	
15	2082	UUCUUGCA	AGAA	GGUGUG	ACCAGAGAAACACACAGUUUGGUACAUUACCU	CACACCA	GUU	UGCAAGAA	GU
2208	UUAUCUTUG	AGAA	GAGCAA	ACCAGAGAAACACACAGUUUGGUACAUUACCU	UUGCUCU	GCU	CAAGAU	GU	
2252	GGAU	AGAA	GUUUGA	ACCAGAGAAACACACAGUUUGGUACAUUACCU	UCAAACA	GCU	CAUCAU	GU	
2444	UGCGGAUA	AGAA	GGUUC	ACCAGAGAAACACACAGUUUGGUACAUUACCU	GGAAACCU	GAC	UAUCCGCA	GU	
2639	GUUUAACG	AGAA	GUAGGA	ACCAGAGAAACACACAGUUUGGUACAUUACCU	UCCUACG	GAC	CGUUAAGC	GU	

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2703	GGCAAUUC	AGAA	GGAUCC	ACCAAGAAACACACGUGGUACAUUACCUGGUAA	GGAUCCA	GAU	GAUUGGCC	
2777	CUAGUTUC	AGAA	GGUCCC	ACCAAGAAACACACGUTUGGGUACAUUACCUGGUAA	GGGACCG	GCU	GAACAUAG	
2832	CCAAAAGC	AGAA	GCCUCA	ACCAAGAAACACACGUTUGGGUACAUUACCUGGUAA	UGAGGCA	GAC	GCUUUUGG	
3199	AAAGCCUG	AGAA	GGCAGA	ACCAAGAAACACACGUGGUACAUUACCUGGUAA	UCUGCCA	GCU	CAGGCCUUU	
5	3278	GUCCCAAG	AGAA	GGAAAGU	ACCAAGAAACACACGUTUGGGUACAUUACCUGGUAA	ACUUCU	GAC	CUTUGGAGC
3304	CACUUGGA	AGAA	GUAAACA	ACCAAGAAACACACGUGGUACAUUACCUGGUAA	UGUUACA	GCU	UCCAAGUG	
3421	CCGGGCCA	AGAA	GAAGUC	ACCAAGAAACACACGUGGUACAUUACCUGGUAA	GACUUCG	GCU	UGGCCCGG	
3450	CUGACAU	AGAA	GGGUCU	ACCAAGAAACACACGUGGUACAUUACCUGGUAA	AGACCCG	GAU	UAUGUCAG	
3475	CAAAGGG	AGAA	GGCAUC	ACCAAGAAACACACGUGGUACAUUACCUGGUAA	GAUGCC	GAC	UCCCCUUG	
10	3663	GUAGUGUA	AGAA	GGAGCC	ACCAAGAAACACACGUGGUACAUUACCUGGUAA	GGCUCU	GAC	UACACUAC
3689	CCAGCAUG	AGAA	GGUACA	ACCAAGAAACACACGUGGUACAUUACCUGGUAA	UGUACCA	GAC	CAUGCUGG	
3703	CUC AUGCC	AGAA	GUCCAG	ACCAAGAAACACACGUGGUACAUUACCUGGUAA	CUGGACU	GCU	GGCAUGAG	
3860	GUGAGGU	AGAA	GGGAGA	ACCAAGAAACACACGUGGUACAUUACCUGGUAA	UCUCCU	GCC	UACCUAC	
3873	AUACAGGA	AGAA	GGUGAG	ACCAAGAAACACACGUGGUACAUUACCUGGUAA	CUCACCU	GUU	UCCUGUAU	
15	4038	UGGCUGUC	AGAA	GGGAUC	ACCAAGAAACACACGUGGUACAUUACCUGGUAA	GAUCCA	GAU	GACAGCCA
4181	AGCCACUG	AGAA	GGUUGG	ACCAAGAAACACACGUGGUACAUUACCUGGUAA	CCAACCA	GAC	CAGUGGCC	
4196	GAUACCCA	AGAA	GGUAGC	ACCAAGAAACACACGUGGUACAUUACCUGGUAA	GCUACCA	GUC	UGGGUAUC	
4212	UCUGUGUC	AGAA	GAGUGA	ACCAAGAAACACACGUGGUACAUUACCUGGUAA	UCACUCA	GAU	GACACAGA	
4278	UCAGGGUG	AGAA	GCAGCA	ACCAAGAAACACACGUGGUACAUUACCUGGUAA	UGCUGCA	GUU	CACGCUGA	

4287	GUCCCCUGA AGAA GCGUGA ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	UCACGGCU GAC UCAGGGAC
4307	AGGAGGUG AGAA GCAGUG ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	CACUGCA GCU CACCUCCU
4318	UCCAUUUA AGAA GGAGGU ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	ACCUCCU GUU UAAAUGGA
4338	GGAGGCCG AGAA GGACCA ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	UGGUCCU GUC CCGGCUC
5 4344	GGGGGGGG AGAA GGGACA ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	UGUCCCG GCU CGGCC
4349	GAGUUGGG AGAA GAGCCG ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	CGGCCUU GGC CCCAACUC
4383	AAAUCUA AGAA GCACCU ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	AGGUGCU GCU UGAAUJJU
4462	UCCUUGCA AGAA GAGGUC ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	GACCUCA GAC UGCAAGGA
4574	GAGACCAC AGAA GGGCAC ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	GUGGCCU GCU GUGGUC
10 4626	UCUUGGAG AGAA GAGUCC ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	GGACUCU GUC CUCCAAGA
4723	CCAAGGUA AGAA GACUCG ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	CGAGUCU GUC UACCUU
4823	CAGGUCC AGAA GCUCUC ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	GAGAGCG GUU GGAGCCU
4836	CACAAUGC AGAA GCAGGC ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	GCCUGCA GAU GCAUUGJG
4896	ACCCUGCC AGAA GCCUUT ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	AAAGGCG GCC GGCAGGGU
15 4938	UGUAACCC AGAA GUGAAG ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	CUTUCACA GUC GGGUAC
4996	ACGUAGA AGAA GGAAGG ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	CCUUCCG GAC UCUUACGU
5042	AAGGAGCA AGAA GCAUCA ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	UGAUGC A GCU UGCUCU
5118	UCGGCCCC AGAA GGAGCC ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	GGCUCCU GAC GGGCCC
5165	CUCCACCC AGAA GAAACC ACCAGAGAAAACACACCGUUGGGUACAUUACCUGGUA	GGUUUCU GCU GGGUGGAG

5310	UUUCUGCC	AGAA	GGAGG	ACCAGAGAAAACACACCGUUGGUACAUUACCUGUA	GCUUCCU	GAU	GGCAGAAA
5363	AUUUCGAA	AGAA	GGCUAG	ACCAGAGAAAACACACCGUUGGUACAUUACCUGUA	CUAGCCA	GAU	UTCGAAAU
5453	AGCACACA	AGAA	GAACC	ACCAGAGAAAACACCGUUGGUACAUUACCUGUA	GGUUUCU	GCC	UGUGUGCU

Table VIII: Mouse *flt-1* VEGF Receptor-Hammerhead Ribozyme and Substrate Sequence

nt. Posi- tion	HH Ribozyme Sequence	Substrate
5		
17	GUGAGCAA CUGAUGA X GAA ACGCGGCC	GGCCGCGUC UUGCUCAC
19	UGGUGAGC CUGAUGA X GAA AGACGCGG	CCGCGUCUU GCUCACCA
23	ACCAUGGU CUGAUGA X GAA AGCAAGAC	GUCUUGCUC ACCAUGGU
32	CAGCAGCU CUGAUGA X GAA ACCAUGGU	ACCAUGGUC AGCUGCUG
10	UAAGGCAA CUGAUGA X GAA ACCGCGGU	ACCGCGGU UUGCCUUA
53	CGUAAGGC CUGAUGA X GAA AGACCGCG	CGCGGUUCUU GCCUUAACG
55	CAGCGCGU CUGAUGA X GAA AGGCAAGA	UCUUGCCUUU ACGCGCUG
60	GCAGCGCG CUGAUGA X GAA AAGGCAAG	CUUGCCUUU CGCGCUGC
61	AGACACCC CUGAUGA X GAA AGCAGCGC	GCGCUGCUC GGGUGUCU
71	GAGAAGCA CUGAUGA X GAA ACACCCGA	UCGGGUGUC UGCUUCUC
15	CCUGUGAG CUGAUGA X GAA AGCAGACA	UGUCUGCUU CUCACAGG
78	UCCUGUGA CUGAUGA X GAA AAGCAGAC	GUCUGCUUC UCACAGGA
83	UAUCCUGU CUGAUGA X GAA AGAAGCAG	CUGCUUCUC ACAGGAUA
84	CUGAGCCA CUGAUGA X GAA AUCCUGUG	CACAGGAUA UGGCUCAG
20	UCGACCCU CUGAUGA X GAA AGCCAUAU	AUAUGGCUC AGGGUCGA
100	UUAACUUC CUGAUGA X GAA ACCCUGAG	CUCAGGGUC GAAGUUAA
106	GCACUUUU CUGAUGA X GAA ACUUCGAC	GUCGAAGUU AAAAGUGC
112	GGCACUUU CUGAUGA X GAA AACUUCGA	UCGAAGUU AAAGUGCC
113	GCCUUUUUA CUGAUGA X GAA ACUCAGUU	AACUGAGUU UAAAAGGC
132	UGCCUUUU CUGAUGA X GAA AACUCAGU	ACUGAGUUU AAAAGGCA
25	GUGCCUUU CUGAUGA X GAA AAACUCAG	CUGAGUUUA AAAGGCAC
133	GUUUGCAU CUGAUGA X GAA ACAUGCUG	CAGCAUGUC AUGCAAGC
134	GAGAAAGA CUGAUGA X GAA AGUCUGGC	GCCAGACUC UCUUUCUC
152	UUGAGAAA CUGAUGA X GAA AGAGUCUG	CAGACUCUC UUUCUCAA
171	ACUUGAGA CUGAUGA X GAA AGAGAGUC	GACUCUCUU UCUCAGU
30	CACUUGAG CUGAUGA X GAA AAGAGAGU	ACUCUCUUU CUCAAGUG
175	GCACUUGA CUGAUGA X GAA AAAGAGAG	CUCUCUUUC UCAAGUGC
176		
177		

156

179	CUGCACUU CUGAUGA X GAA AGAAAGAG	CUCUUUCUC AAGUGCAG
205	GAGACCAU CUGAUGA X GAA AGUGGGCU	AGCCCACUC AUGGUCUC
211	UGGGCAGA CUGAUGA X GAA ACCAUGAG	CUCAUGGUC UCUGCCCA
213	CGUGGGCA CUGAUGA X GAA AGACCAUG	CAUGGUCUC UGCCACG
5	254 GGGGGAGU CUGAUGA X GAA AUGCUCAG	CUGAGCAUC ACUCCCCC
	258 CGAUGGGG CUGAUGA X GAA AGUGAUGC	GCAUCACUC CCCCAUCG
	265 CACAGGCC CUGAUGA X GAA AUGGGGGA	UCCCCCAUC GGCCUGUG
	282 UUGCCUGU CUGAUGA X GAA AUCCCCUCC	GGAGGGAUUA ACAGGCCA
	292 UGCUGCAG CUGAUGA X GAA AUJGCCUG	CAGGCAAUU CUGCAGCA
10	293 GUGCUGCA CUGAUGA X GAA AAUJGCCU	AGGCAAUJC UGCAGCAC
	304 CCAAGGUC CUGAUGA X GAA AGGUGCUG	CAGCACCUU GACCUJUGG
	310 CCGUGUCC CUGAUGA X GAA AGGUCAAG	CUUGACCUU GGACACGG
	341 CAGGUGUA CUGAUGA X GAA AGGCCGU	ACGGGCCUC UACACCUG
	343 UACAGGUG CUGAUGA X GAA AGAGGCC	GGGCCUCUA CACCUGUA
15	351 GAGGUUAUC CUGAUGA X GAA ACAGGUGU	ACACCUGUA GAUACCUC
	355 UAGGGAGG CUGAUGA X GAA AUCUACAG	CUGUAGAUUA CCUCCCUA
	359 GAUGUAGG CUGAUGA X GAA AGGUAUU	AGAUACCUC CCUACAUC
	363 AGUAGAUG CUGAUGA X GAA AGGGAGGU	ACCUCCCUA CAUCUACU
	367 UCGAAGUA CUGAUGA X GAA AUGUAGGG	CCCUACAUUC UACUUCGA
20	369 CUUCGAAG CUGAUGA X GAA AGAUGUAG	CUACAUCAUA CUUCGAAG
	372 UUUCUUCG CUGAUGA X GAA AGUAGAUG	CAUCUACUU CGAAGAAA
	373 UUUUCUUC CUGAUGA X GAA AAGUAGAU	AUCUACUUC GAAGAAAA
	394 AGAUUGAA CUGAUGA X GAA AUUCCGCU	AGCGGAAUC UUCAAUCU
	396 GUAGAUUG CUGAUGA X GAA AGAUUCCG	CGGAAUCUU CAAUCUAC
25	397 UGUAGAUU CUGAUGA X GAA AAGAUUCC	GGAAUCUUC AAUCUACA
	401 AAUAUGUA CUGAUGA X GAA AUUGAAGA	UCUUCAAUC UACAUUU
	403 CAAAUAAUG CUGAUGA X GAA AGAUUGAA	UUCAAUCUA CAUAAUUG
	407 CUAACAAA CUGAUGA X GAA AUGUAGAU	AUCUACAUUA UUJGUUJAG
	409 CACUAACA CUGAUGA X GAA AUAUGUAG	CUACAUAUU UGUUAGUG
30	410 UCACUAAC CUGAUGA X GAA AAUAUGUA	UACAUAUUU GUUAGUGA
	413 GCAUCACU CUGAUGA X GAA ACAAAUAU	AUAUJGUUU AGUGAUGC
	414 UGCAUCAC CUGAUGA X GAA AACAAUUA	UAUUJGUUA GUGAUGCA
	429 UAUGAAAG CUGAUGA X GAA ACUCCUG	CAGGGAGUC CUUCAUA

432	CUCUAUGA CUGAUGA X GAA AGGACUCC	GGAGUCCUU UCAUAGAG
433	UCUCUAUG CUGAUGA X GAA AAGGACUC	GAGUCCUUU CAUAGAGA
434	AUCUCUAU CUGAUGA X GAA AAAGGACU	AGUCCUUJC AUAGAGAU
437	UGCAUCUC CUGAUGA X GAA AUGAAAGG	CCUUUCAUA GAGAUGCA
5	455 AGUUUGGG CUGAUGA X GAA AUGUCAGU	ACUGACAUA CCCAAACU
464	AUGUGCAC CUGAUGA X GAA AGUUUGGG	CCCAAACUU GUGCACAU
491	GGGAUGAU CUGAUGA X GAA AGCUGUCU	AGACAGCUC AUCAUCCC
494	CAGGGGAU CUGAUGA X GAA AUGAGCUG	CAGCUCAUC AUCCCCUG
497	CGGCAGGG CUGAUGA X GAA AUGAUGAG	CUCAUCAUC CCCUGCCG
10	514 CGUUGGGU CUGAUGA X GAA ACGUCACC	GGUGACGUC ACCCAACG
524	GUGACUGU CUGAUGA X GAA ACGUUGGG	CCCAACGUC ACAGUCAC
530	UUUAGGGU CUGAUGA X GAA ACUGUGAC	GUCACAGUC ACCCUAAA
536	AACUUUUU CUGAUGA X GAA AGGGUGAC	GUCACCCUA AAAAAGUU
544	CAAUUGGA CUGAUGA X GAA ACUUUUUU	AAAAAAAGUU UCCAUJUG
15	545 UCAAAUUG CUGAUGA X GAA AACUUUUU	AAAAAGUUU CCAUUJUGA
546	AUCAAAUUG CUGAUGA X GAA AAACUUUU	AAAAGUUUC CAUUJUGAU
550	GAGUAUCA CUGAUGA X GAA AUGGAAAC	GUUUCCAUU UGAUACUC
551	AGAGUAUC CUGAUGA X GAA AAUGGAAA	UUUCCAUUU GAUACUCU
555	GGUAAGAG CUGAUGA X GAA AUCAAAUG	CAUUJUGUA CUCUUACC
20	558 AGGGGUAA CUGAUGA X GAA AGUAUCAA	UUGAUACUC UUACCCU
560	UCAGGGGU CUGAUGA X GAA AGAGUAUC	GAUACUCUU ACCCCUGA
561	AUCAGGGG CUGAUGA X GAA AAGAGUAU	AUACUCUUA CCCCUGAU
581	UCCCAUGU CUGAUGA X GAA AUUCUUJUG	CAAAGAAUA ACAUGGGA
594	GCCUCUCC CUGAUGA X GAA ACUGUCCC	GGGACAGUA GGAGAGGC
25	604 CUAAUUA CUGAUGA X GAA AGCCUCUC	GAGAGGCUU UAUAAUAG
605	GCUAUUAU CUGAUGA X GAA AAGCCUCU	AGAGGCUUU AUAAUAGC
606	UGCUAUUA CUGAUGA X GAA AAAGCCUC	GAGGCUUUA UAAUAGCA
608	UUUGCUAL CUGAUGA X GAA AUAAAGCC	GGCUUUUAU AUAGCAAA
611	GCAUUUGC CUGAUGA X GAA AUUAUAAA	UUUAUAAA GCAAUUGC
30	625 UCUCUUUG CUGAUGA X GAA ACGUJUGCA	UGCAACGUA CAAAGAGA
635	AGCAGUCC CUGAUGA X GAA AUCUCUUU	AAAGAGAUA GGACUGCU
662	UGCCCGUU CUGAUGA X GAA ACGGUGGC	GCCACCGUC AACGGGCA
676	UUGUCUGG CUGAUGA X GAA ACAGGUGC	GCACCUUGUA CCAGACAA

688	GGGUCAGA CUGAUGA X GAA AGUUUGUC	GACAAACUA UCUGACCC
690	AUGGGUCA CUGAUGA X GAA AUAGUUJUG	CAAACUAUC UGACCCAU
699	GGUCUGCC CUGAUGA X GAA AUGGGUCA	UGACCCAUC GGCAGACC
711	UAGGAUUG CUGAUGA X GAA AUUGGUCU	AGACCAAUA CAAUCCUA
5 716	ACAUCUAG CUGAUGA X GAA AUUGUAUU	AAUACAAUC CUAGAUGU
719	UGGACAUC CUGAUGA X GAA AGGAUJGU	ACAAUCCUA GAUGUCCA
725	CGUAUUJUG CUGAUGA X GAA ACAUCUAG	CUAGAUGUC CAAAUACG
731	GGCGGGCG CUGAUGA X GAA AUUUGGAC	GUCCAAAUA CGCCCGCC
758	UGCCCGUG CUGAUGA X GAA AGCAGUCU	AGACUGCUC CACGGGCA
10 771	GAGGACAA CUGAUGA X GAA AGUCUGCC	GGCAGACUC UUGUCCUC
773	UUGAGGAC CUGAUGA X GAA AGAGUCUG	CAGACUCUU GUCCUCAA
776	CAGUUGAG CUGAUGA X GAA ACAAGAGU	ACUCUUGUC CUCAACUG
779	GUGCAGUU CUGAUGA X GAA AGGACAAG	CUUGUCCUC AACUGCAC
803	CUCGUAUU CUGAUGA X GAA AGCUCCGU	ACGGAGCUC AAUACGAG
15 807	CACCCUCG CUGAUGA X GAA AUUGAGCU	AGCUCAAUA CGAGGGUG
831	ACCAGGGU CUGAUGA X GAA AUUCCAGC	GCUGGAAUU ACCCUGGU
832	UACCAGGG CUGAUGA X GAA AAUUCCAG	CUGGAAUUA CCCUGGUA
840	AGUUGCUU CUGAUGA X GAA ACCAGGGU	ACCCUGGUA AAGCAACU
849	UGCUCUCU CUGAUGA X GAA AGUUGCUU	AAGCAACUA AGAGAGCA
20 859	GCCUUUAUA CUGAUGA X GAA AUGCUCUC	GAGAGCAUC UAUAAAGGC
861	CUGCCUUA CUGAUGA X GAA AGAUGCUC	GAGCAUCUA UAAGGCAG
863	CGCUGCCU CUGAUGA X GAA AUAGAUGC	GCAUCUAAAGGCAGCG
875	CUCCGGUC CUGAUGA X GAA AUCCGCUG	CAGCGGAUU GACCGGAG
888	GUUGUGGG CUGAUGA X GAA AUGGCUCC	GGAGCCAUAUU CCCACAAC
25 889	UGUUGUGG CUGAUGA X GAA AAUGGCUC	GAGCCAUC CCACAACA
904	CACUGUGG CUGAUGA X GAA ACACAUJUG	CAAUGUGUU CCACAGUG
905	ACACUGUG CUGAUGA X GAA AACACAUU	AAUGUGUUC CACAGUGU
914	AUCUUAAG CUGAUGA X GAA ACACUGUG	CACAGUGUU CUUAAGAU
915	GAUCUUAA CUGAUGA X GAA AACACUGU	ACAGUGUUC UUAAGAUC
30 917	UUGAUCUU CUGAUGA X GAA AGAACACU	AGUGUUCUU AAGAUCAA
918	GUUGAUCU CUGAUGA X GAA AAGAACAC	GUGUUCUUA AGAUCAAC
923	ACAUUGUU CUGAUGA X GAA AUCUUAAG	CUUAAGAUC AACAAUGU
953	CAGGUGUA CUGAUGA X GAA AGCCCCUU	AAGGGGCUC UACACCUG

159

955	GACAGGUG CUGAUGA X GAA AGAGCCCC	GGGGCUCUA CACCUGUC
963	CUUCACGC CUGAUGA X GAA ACAGGUGU	ACACCUGUC GCGUGAAG
979	GGAACGAG CUGAUGA X GAA ACCCACUC	GAGUGGGUC CUCGUUCC
982	ACUGGAAC CUGAUGA X GAA AGGACCCA	UGGGUCCUC GUUCCAGU
5	985 AAGACUGG CUGAUGA X GAA ACGAGGAC	GUCCUCGUU CCAGUCUU
986	AAAGACUG CUGAUGA X GAA AACGAGGA	UCCUCGUUC CAGUCUUU
991	UGUUGAAA CUGAUGA X GAA ACUGGAAC	GUUCCAGUC UUUCAACA
993	GGUGUUGA CUGAUGA X GAA AGACUGGA	UCCAGUCUU UCAACACC
994	AGGUGUUG CUGAUGA X GAA AAGACUGG	CCAGUCUUU CAACACCU
10	995 GAGGUGUU CUGAUGA X GAA AAAGACUG	CAGUCUUUC AACACCUUC
1003	CAUGCACG CUGAUGA X GAA AGGUGUUG	CAACACCUC CGUGCAUG
1015	CUUUUUCU CUGAUGA X GAA ACACAUCC	GCAUGUGUA UGAAAAAG
1027	CACUGAUG CUGAUGA X GAA AUCCUUUU	AAAAGGAUU CAUCAGUG
1028	ACACUGAU CUGAUGA X GAA AAUCCUUU	AAAGGAUUC AUCAGUGU
15	1031 UUCACACU CUGAUGA X GAA AUGAAUCC	GGAUUCAUC AGUGUGAA
1044	CUGCUUCC CUGAUGA X GAA AUGUUUCA	UGAAACAUUC GGAAGCAG
1084	GCCGAUAG CUGAUGA X GAA ACCGUCUU	AAGACGGUC CUAUCGGC
1087	ACAGCCGA CUGAUGA X GAA AGGACCGU	ACGGUCCUA UCGGCUGU
1089	GGACAGCC CUGAUGA X GAA AUAGGACC	GGUCCUAUC GGCUGUCC
20	1096 CUUUCAUG CUGAUGA X GAA ACAGCCGA	UCGGCUGUC CAUGAAAG
1114	GGGAGGGG CUGAUGA X GAA AGGCCUUC	GAAGGCCUU CCCUCCCC
1115	GGGGAGGG CUGAUGA X GAA AAGGCCUU	AAGGCCUUC CCCUCCCC
1120	UUUCUGGG CUGAUGA X GAA AGGGGAAG	CUUCCCCUC CCCAGAAA
1130	AACCAUAC CUGAUGA X GAA AUUUCUGG	CCAGAAAUC GUAUGGUU
25	1133 UUUUACCA CUGAUGA X GAA ACGAUUUC	GAAAUCGUA UGGUAAA
1138	CAUCUUUU CUGAUGA X GAA ACCAUACG	CGUAUGGUU AAAAGAUG
1139	CCAUCUUU CUGAUGA X GAA AACCAUAC	GUAUGGUUA AAAGAUGG
1150	UUGCAGGC CUGAUGA X GAA AGCCAUCU	AGAUGGCUC GCCUGCAA
1162	CAGACUUC CUGAUGA X GAA AUGUUGCA	UGCAACAUU GAAGUCUG
30	1168 AGCGAGCA CUGAUGA X GAA ACUCAAU	AUUGAAGUC UGCUCGCU
1173	CAAAUAGC CUGAUGA X GAA AGCAGACU	AGUCUGGCUC GCUAUUUG
1177	GUACCAAA CUGAUGA X GAA AGCGAGCA	UGCUCGCUA UUJGGUAC
1179	AUGUACCA CUGAUGA X GAA AUAGCGAG	CUCGCUAUU UGGUACAU

	1180	CAGUUACC CUGAUGA X GAA AAUAGCGA	UCGCUAUUU GGUACAU
	1184	UAGCCAUG CUGAUGA X GAA ACCAAAUA	UAUUUJGGUA CAUGGCUA
	1192	UUAAUGAG CUGAUGA X GAA AGCCAUGU	ACAUGGCUA CUCAUUAA
	1195	UAAAUAU CUGAUGA X GAA AGUAGGCCA	UGGCUACUC AUUAAUUA
5	1198	UGAUAAUU CUGAUGA X GAA AUGAGUAG	CUACUCAUU AAUUAUCA
	1199	UUGAUAAU CUGAUGA X GAA AAUGAGUA	UACUCAUUA AUUAUCAA
	1202	UCUUUGAU CUGAUGA X GAA AUJAAUGA	UCAUUAUU AUCAAAGA
	1203	AUCUUUGA CUGAUGA X GAA AAUUAUAG	CAUUAUUA UCAAAGAU
	1205	ACAUCUUU CUGAUGA X GAA AUAAUUAA	UUAUUAUAC AAAGAUGU
10	1237	AGAUCGUA CUGAUGA X GAA AGUCCCU	AGGGGACUA UACGAUCU
	1239	CAAGAUCG CUGAUGA X GAA AUAGUCCC	GGGACUAUA CGAUCUUG
	1244	CCCAGCAA CUGAUGA X GAA AUCGUUA	UAUACGAUC UUGCUGGG
	1246	UGCCCAGC CUGAUGA X GAA AGAUCGUA	UACGAUCUU GCUGGGCA
	1256	GACUGCUU CUGAUGA X GAA AUGCCAG	CUGGGCAUA AAGCAGUC
15	1264	AUAGCCUU CUGAUGA X GAA ACUGCUUU	AAAGCAGUC AAGGCUAU
	1271	UUUUUAAA CUGAUGA X GAA AGCCUUGA	UCAAGGCUA UUUAAAAA
	1273	GGUUUUUA CUGAUGA X GAA AUAGCCUU	AAGGCUAUU UAAAAACC
	1274	AGGUUUUU CUGAUGA X GAA AAUAGCCU	AGGCUAUUU AAAAACCU
	1275	GAGGUUUU CUGAUGA X GAA AAAUAGCC	GGCUAUUA AAAACCUC
20	1283	GUGGCAGU CUGAUGA X GAA AGGUUUUU	AAAAACCUC ACUGCCAC
	1293	UACAAUGA CUGAUGA X GAA AGUGGCAG	CUGCCACUC UCAUJUGUA
	1295	UUUACAAU CUGAUGA X GAA AGAGUGGC	GCCACUCUC AUUGUAAA
	1298	ACGUUUUAC CUGAUGA X GAA AUGAGAGU	ACUCUCAUU GUAAACGU
	1301	UUCACGUU CUGAUGA X GAA ACAAUGAG	CUCAUJUGUA AACGUGAA
25	1314	GUAGAUCU CUGAUGA X GAA AGGUUUC	UGAAACCUC AGAUCUAC
	1319	UUUUCGUA CUGAUGA X GAA AUCUGAGG	CCUCAGAUC UACGAAAA
	1321	ACUUUUCG CUGAUGA X GAA AGAUCUGA	UCAGAUCUA CGAAAAGU
	1330	AGGACACG CUGAUGA X GAA ACUUUUCG	CGAAAAGUC CGUGUCCU
	1336	GAAGCGAG CUGAUGA X GAA ACACGGAC	GUCCGUGUC CUCGCUUC
30	1339	UUGGAAGC CUGAUGA X GAA AGGACACG	CGUGUCCUC GCUUCCAA
	1343	GGGCUUGG CUGAUGA X GAA AGCGAGGA	UCCUCGCUU CCAAGCCC
	1344	UGGGCUUG CUGAUGA X GAA AAGCGAGG	CCUCGCUUC CAAGCCCA
	1356	CGGAUAGA CUGAUGA X GAA AGGUGGGC	GCCCACCUC UCUAUCCG

1358	AGCGGAUA CUGAUGA X GAA AGAGGUGG	CCACCUCUC UAUCCGCU
1360	CCAGCGGA CUGAUGA X GAA AGAGAGGU	ACCUCUCUA UCCGCUGG
1362	GCCCAGCG CUGAUGA X GAA AUAGAGAG	CUCUCUAUC CGCUGGGC
1382	CAAGUGAG CUGAUGA X GAA ACUUGUCU	AGACAAGUC CUCACUUG
5	1385 GUGCAAGU CUGAUGA X GAA AGGACUUG	CAAGUCCUC ACUUGCAC
	1389 CACGGUGC CUGAUGA X GAA AGUGAGGA	UCCUCACUU GCACCGUG
	1399 GGAUGCCA CUGAUGA X GAA ACACGGUG	CACCGUGUA UGGCAUCC
	1406 GGCGGAGG CUGAUGA X GAA AUGCCAUA	UAUGGCAUC CCUCGGCC
	1410 UGUUGGCC CUGAUGA X GAA AGGGAUGC	GCAUCCCUC GGCCAACA
10	1421 AGCCACGU CUGAUGA X GAA AUUGUJUGG	CCAACAAUC ACGUGGGCU
	1430 GGGUGCCA CUGAUGA X GAA AGCCACGU	ACGUGGCUC UGGCACCC
	1443 AUUGUGGU CUGAUGA X GAA ACAGGGGU	ACCCCUGUC ACCACAAU
	1452 UUJUGGAGU CUGAUGA X GAA AUUGUGGU	ACCACAAUC ACUCCAAA
	1456 UUUCUUUG CUGAUGA X GAA AGUGAUJUG	CAAUCACUC CAAAGAAA
15	1468 AGAAGUCA CUGAUGA X GAA ACCUUUCU	AGAAAGGUA UGACUUCU
	1474 CAGUGCAG CUGAUGA X GAA AGUCAUAC	GU AUGACUU CUGCACUG
	1475 UCAGUGCA CUGAUGA X GAA AAGUCAUA	UAUGACUUC UGCACUGA
	1495 GGAAUAAAG CUGAUGA X GAA AUUCUUCA	UGAAGAAUC CUUUAUCC
	1498 CCAGGAUA CUGAUGA X GAA AGGAUJCU	AGAAUCCUU UAUCUUGG
20	1499 UCCAGGAU CUGAUGA X GAA AAGGAUUC	GAAUCCUUU AUCCUGGA
	1500 AUCCAGGA CUGAUGA X GAA AAAGGAUU	AAUCCUUUA UCCUGGAU
	1502 GGAUCCAG CUGAUGA X GAA AUAAAGGA	UCCUUUAUC CUGGAUCC
	1509 GCUGCGUG CUGAUGA X GAA AUCCAGGA	UCCUGGAUC CCAGCAGC
	1522 UGUUUUCCU CUGAUGA X GAA AGUUGCUG	CAGCAACUU AGGAAACA
25	1523 CUGUUUCC CUGAUGA X GAA AAGUJUGCU	AGCAACUUA GGAAACAG
	1535 AUGCUCUC CUGAUGA X GAA AUUCUGUU	AACAGAAUU GAGAGCAU
	1544 CGCUGAGA CUGAUGA X GAA AUGCUCUC	GAGAGCAUC UCUCAGCG
	1546 UGCGCUGA CUGAUGA X GAA AGAUGCUC	GAGCAUCUC UCAGCGCA
	1548 CAUGCGCU CUGAUGA X GAA AGAGAUGC	GCAUCUCUC AGCGCAUG
30	1562 CCUUCUAU CUGAUGA X GAA ACCGUCAU	AUGACGGUC AUAGAAGG
	1565 GUUCCUUC CUGAUGA X GAA AUGACCGU	ACGGGUCAUA GAAGGAAC
	1578 AACCGUCU CUGAUGA X GAA AUUUGUUC	GAACAAAUA AGACGGUU
	1586 AAUGUGCU CUGAUGA X GAA ACCGUUU	AAGACGGUU AGCACAUU

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1587	CAAUGUGC CUGAUGA X GAA AACCGUCU	AGACGGUUA GCACAUUG
1594	CCACCACC CUGAUGA X GAA AUGUGCUA	UAGCACAUU GGUGGUGG
1609	GGGUCUGA CUGAUGA X GAA AGUCAGCC	GGCUGACUC UCAGACCC
1611	AGGGGUCU CUGAUGA X GAA AGAGUCAG	CUGACUCUC AGACCCU
5	1625 CAGCUGUA CUGAUGA X GAA AUUCCAGG	CCUGGAAUC UACAGCUG
	1627 GGCAGCUG CUGAUGA X GAA AGAUUCCA	UGGAAUCUA CAGCUGCC
	1642 UUUUAUUG CUGAUGA X GAA AGGCCGG	CCGGGCCUU CAAUAAA
	1643 AUUUUAUU CUGAUGA X GAA AAGGCCCG	CGGGCCUUC AAUAAA
	1647 CCCUAUUU CUGAUGA X GAA AUUGAAGG	CCUUCAAUA AAAUAGGG
10	1652 ACAGUCCC CUGAUGA X GAA AUUUUAUU	AAUAAAUA GGGACUGU
	1673 UAAAAAUU CUGAUGA X GAA AUGUUUCU	AGAAACAUUA AAUJJJUA
	1678 UGACAUAA CUGAUGA X GAA AUUUUAUG	CAUAAAUAU UUAUGUCA
	1679 GUGACAUUA CUGAUGA X GAA AAUUUUAU	AUAAAUAU UAUGUCAC
	1680 UGUGACAU CUGAUGA X GAA AAUUUUUA	UAAAUAUJU AUGUCACA
15	1681 CUGUGACA CUGAUGA X GAA AAAAUUUU	AAAUAUUA UGUCACAG
	1685 ACAUCUGU CUGAUGA X GAA ACAUAAA	UUUUAUGUC ACAGAUGU
	1705 AACGUGA CUGAUGA X GAA AGCCAUJC	GAAUGGCUU UCACGUUU
	1706 GAAACGUG CUGAUGA X GAA AAGCCAUU	AAUGGCUUU CACGUUJC
	1707 GGAAACGU CUGAUGA X GAA AAAGCCAU	AUGGCUUUC ACGUUUCC
20	1712 UCCAAGGA CUGAUGA X GAA ACGUGAAA	UUUCACGUU UCCUUGGA
	1713 UUCCAAGG CUGAUGA X GAA AACGUGAA	UUCACGUUU CCUUGGAA
	1714 UUCCAAG CUGAUGA X GAA AAACGUGA	UCACGUUUC CUJGGAAA
	1717 UCUUUUCC CUGAUGA X GAA AGGAAACG	CGUUUCCUU GGAAAAGA
	1756 CCACACAG CUGAUGA X GAA ACAGUUUC	GAAACUGUC CUGUGUGG
25	1766 AAUUUAUU CUGAUGA X GAA ACCACACA	UGUGUGGUC AAUAAAUA
	1770 CAGGAAUU CUGAUGA X GAA AUUGACCA	UGGUCAAUA AAUCCUG
	1774 UGUACAGG CUGAUGA X GAA AUUUAUUG	CAUAAAUAU CCUGUACCA
	1775 CUGUACAG CUGAUGA X GAA AAUUUAUU	AAUAAAUAUC CUGUACAG
	1780 UGUCUCUG CUGAUGA X GAA ACAGGAAU	AUUCCUGUA CAGAGACA
30	1790 AUCCAGGU CUGAUGA X GAA AUGUCUCU	AGAGACAUU ACCUGGAU
	1791 AAUCCAGG CUGAUGA X GAA AAUGUCUC	GAGACAUUA CCUGGAUU
	1799 CGUAGCAG CUGAUGA X GAA AUCCAGGU	ACCUGGAUU CUGCUACG
	1800 CCGUAGCA CUGAUGA X GAA AAUCCAGG	CCUGGAUUC UGCUACGG

1805	ACUGUCCG CUGAUGA X GAA AGCAGAAU	AUUCUGCUA CGGACAGU
1814	CUGUJGUU CUGAUGA X GAA ACUGUCCG	CGGACAGUU ACAACAG
1815	UCUGUJGU CUGAUGA X GAA AACUGUCC	GGACAGUUA ACAACAGA
1836	GCUGAUAC CUGAUGA X GAA AUGGUGCA	UGCACCAUA GUAUCAGC
5	1839 CUUGCUGA CUGAUGA X GAA ACUAUGGU	ACCAUAGUA UCAGCAAG
1841	UGCUJGU CUGAUGA X GAA AUACUAUG	CAUAGUAUC AGCAAGCA
1866	GUAAUCUU CUGAUGA X GAA AGUGGUGG	CCACCACUC AAGAUUAC
1872	GAUGGGAG CUGAUGA X GAA AUCUUGAG	CUCAAGAUU ACUCCAUC
1873	UGAUGGAG CUGAUGA X GAA AAUCUUGA	UCAAGAUUA CUCCAUCA
10	1876 GAGUGAUG CUGAUGA X GAA AGUAAUCU	AGAUUACUC CAUCACUC
1880	UUCAGAGU CUGAUGA X GAA AUGGAGUA	UACUCCAUC ACUCUGAA
1884	AAGGUUCA CUGAUGA X GAA AGUGAUGG	CCAUCACUC UGAACCUU
1892	UUGAUGAC CUGAUGA X GAA AGGUUCAG	CUGAACCUU GUCAUCAA
1895	UUCUUGAU CUGAUGA X GAA ACAAGGUU	AACCUUGUC AUCAAGAA
15	1898 ACGUUCUU CUGAUGA X GAA AUGACAAG	CUUGUCAUC AAGAACGU
1909	CUUCUAGA CUGAUGA X GAA ACACGUUC	GAACGUGUC UCUAGAAG
1911	GUCUUCUA CUGAUGA X GAA AGACACGU	ACGUGUCUC UAGAAGAC
1913	GAGUCUUC CUGAUGA X GAA AGAGACAC	GUGUCUCUA GAAGACUC
1921	AGGUGCCC CUGAUGA X GAA AGUCUUCU	AGAAGACUC GGGCACCU
20	1930 UGCACGCA CUGAUGA X GAA AGGUGCCC	GGGCACCUA UGCGUGCA
1952	CCUGUGUA CUGAUGA X GAA AUGUUCCU	AGGAACAUUA UACACAGG
1954	CCCCUGUG CUGAUGA X GAA AUAUGUUC	GAACAUUAUA CACAGGGG
1970	UUCCGAAG CUGAUGA X GAA AUGUCUUC	GAAGACAUUC CUUCGGAA
1973	GUCUUCCG CUGAUGA X GAA AGGAUGUC	GACAUCCUU CGGAAGAC
25	1974 UGUCUUCC CUGAUGA X GAA AAGGAUGU	ACAUCCUUC GGAAGACA
1988	CUAACGAG CUGAUGA X GAA ACUUCUGU	ACAGAAGUU CUCGUUAG
1989	UCUAACGA CUGAUGA X GAA AACUUCUG	CAGAAGUUC UCGUUAGA
1991	UCUCUAAC CUGAUGA X GAA AGAACUUC	GAAGUUCUC GUUAGAGA
1994	GAAUCUCU CUGAUGA X GAA ACGAGAAC	GUUCUCGUU AGAGAUUC
30	1995 CGAAUCUC CUGAUGA X GAA AACGAGAA	UUCUCGUUA GAGAUUCG
2001	CGCUUCCG CUGAUGA X GAA AUCUCUAA	UUAGAGAUU CGGAAGCG
2002	GCGCUUCC CUGAUGA X GAA AAUCUCUA	UAGAGAUUC GGAAGCGC
2021	AGGUUUUG CUGAUGA X GAA AGCAGGUG	CACCUUGCUU CAAAACCU

	2022	GAGGUUUU CUGAUGA X GAA AAGCAGGU	ACCUGCUUC AAAACCUC
	2030	UAGUCACU CUGAUGA X GAA AGGUUUUG	CAAAACCUC AGUGACUA
	2038	AGACCUCG CUGAUGA X GAA AGUCACUG	CAGUGACUA CGAGGUCU
	2045	CUGAUGGA CUGAUGA X GAA ACCUCGUA	UACGAGGUC UCCAUCAG
5	2047	CACUGAUG CUGAUGA X GAA AGACCUCG	CGAGGUCUC CAUCAGUG
	2051	GAGCCACU CUGAUGA X GAA AUGGAGAC	GUCUCCAUC AGUGGCUC
	2059	AGGUCGUA CUGAUGA X GAA AGCCACUG	CAGUGGCUC UACGACCU
	2061	UAAGGUUCG CUGAUGA X GAA AGAGCCAC	GUGGCUCUA CGACCUUA
	2068	GACAGUCU CUGAUGA X GAA AGGUCCUA	UACGACCUU AGACUGUC
10	2069	UGACAGUC CUGAUGA X GAA AAGGUCGU	ACGACCUUA GACUGUCA
	2076	UCUAGCUU CUGAUGA X GAA ACAGUCUA	UAGACUGUC AAGCUAGA
	2082	GACACCUC CUGAUGA X GAA AGCUUGAC	GUCAAGCUA GAGGUGUC
	2090	GGCGCGGG CUGAUGA X GAA ACACCUCU	AGAGGUGUC CCCGCGCC
	2100	AGUGAUCU CUGAUGA X GAA AGGCGCGG	CCGCGCCUC AGAUCACU
15	2105	AACCAAGU CUGAUGA X GAA AUCUGAGG	CCUCAGAUC ACUJUGGUU
	2109	UUUGAACCG CUGAUGA X GAA AGUGAUCU	AGAUCACUU GGUUCAAA
	2113	UGUIUUUJUG CUGAUGA X GAA ACCAAGUG	CACUJUGGUU CAAAAACA
	2114	UUGUUUUU CUGAUGA X GAA AACCAAGU	ACUJUGGUUC AAAAACAA
	2132	UCUUGUUG CUGAUGA X GAA AUUUUGUG	CACAAAAUA CAACAAGA
20	2150	CCUAAAAAU CUGAUGA X GAA AUUCCCGG	CCGGGAAUU AUUUUAGG
	2151	UCCUAAAA CUGAUGA X GAA AAUCCCG	CGGGAAUUA UUUUAGGA
	2153	GGUCCUAA CUGAUGA X GAA AUAAUUCC	GGAAUUAUU UUAGGACC
	2154	UGGUCCUA CUGAUGA X GAA AAUAAUUC	GAAUUAUUU UAGGACCA
	2155	CUGGUCCU CUGAUGA X GAA AAAUAAU	AAUUUAUUU AGGACCAG
25	2156	CCUGGUCC CUGAUGA X GAA AAAUAAU	AUUUAUUUA GGACCAGG
	2179	UUUCAAUA CUGAUGA X GAA ACAGCGUG	CACGCUGUU UAUUGAAA
	2180	CUUUCAAU CUGAUGA X GAA AACAGCGU	ACGCUGUUU AUUGAAAG
	2181	UCUUUCAA CUGAUGA X GAA AAACAGCG	CGCUGUUUA UUGAAAGA
	2183	ACUCUUUC CUGAUGA X GAA AUAAACAG	CUGUUUAUU GAAAGAGU
30	2192	UCCUCUGU CUGAUGA X GAA ACUCUUUC	GAAAGAGUC ACAGAGGA
	2213	CACCUAAU CUGAUGA X GAA ACACCCUC	GAGGGUGUC UAUAGGUG
	2215	GGCACCUA CUGAUGA X GAA AGACACCC	GGGUGUCUA UAGGUGCC
	2217	UCGGCACC CUGAUGA X GAA AUAGACAC	GUGUCUUA GGUGCCGA

2263	CGGUGAGG CUGAUGA X GAA AGGCUGCG	CGCAGCCUA CCUCACCG
2267	UGCACGGU CUGAUGA X GAA AGGUAGGC	GCCUACCUC ACCGUGCA
2284	ACUUGUCU CUGAUGA X GAA AGGUUCCU	AGGAACCUC AGACAAGU
2293	CCAGGUUU CUGAUGA X GAA ACUUGUCU	AGACAAGUC AAACCUGG
5 2309	GUGAGCGU CUGAUGA X GAA AUCAGCUC	GAGCUGAUC ACGCUCAC
2315	GUGCACGU CUGAUGA X GAA AGCGUGAU	AUCACGCUC ACGUGCAC
2342	AGCCAAAA CUGAUGA X GAA AGGGUCGC	GCGACCCUC UUUUGGCU
2344	GGAGCCAA CUGAUGA X GAA AGAGGGUC	GACCCUCUU UUGGCUCC
2345	AGGAGCCA CUGAUGA X GAA AAGAGGGU	ACCCUCUUU UGGCUCCU
10 2346	AAGGAGCC CUGAUGA X GAA AAAGAGGG	CCCUCUUUU GGCUCCUU
2351	GUUAGAAG CUGAUGA X GAA AGCCAAAA	UUUUGGCUC CUUCUAAC
2354	AGAGUUAG CUGAUGA X GAA AGGAGCCA	UGGCUCCUU CUAACUCU
2355	GAGAGUUA CUGAUGA X GAA AAGGAGCC	GGCUCCUUC UAACUCUC
2357	AAGAGAGU CUGAUGA X GAA AGAAGGAG	CUCCUUCUA ACUCUCUU
15 2361	GAUGAAGA CUGAUGA X GAA AGUUAGAA	UUCUAACUC UCUUCAUC
2363	CUGAUGAA CUGAUGA X GAA AGAGUUAG	CUAACUCUC UUCAUCAG
2365	UUCUGAUG CUGAUGA X GAA AGAGAGUU	AACUCUCUU CAUCAGAA
2366	UUUCUGAU CUGAUGA X GAA AAGAGAGU	ACUCUCUUC AUCAGAAA
2369	AGUUUUUCU CUGAUGA X GAA AUGAAGAG	CUCUUCAUC AGAAAACU
20 2386	CGGAAGAA CUGAUGA X GAA ACCGCUUC	GAAGCGGUC UUCUCCG
2388	UUCGGAAG CUGAUGA X GAA AGACCGCU	AGCGGUCUU CUUCCGAA
2389	CUUCGGAA CUGAUGA X GAA AAGACCGC	GCGGUCUUC UUCCGAAG
2391	UACUUCGG CUGAUGA X GAA AGAAGACC	GGUCUUCUU CCGAAGUA
2392	UUACUUCG CUGAUGA X GAA AAGAAGAC	GUCUUCUUC CGAAGUAA
25 2399	UCUGUCUU CUGAUGA X GAA ACUUCGGA	UCCGAAGUA AAGACAGA
2410	UUGACAGG CUGAUGA X GAA AGUCUGUC	GACAGACUA CCUGUCAA
2416	UAAUGAUU CUGAUGA X GAA ACAGGUAG	CUACCUGUC AAUCAUUA
2420	UCCAUAUU CUGAUGA X GAA AUUGACAG	CUGUCAAUC AUUAUGGA
2423	GGGUCCAU CUGAUGA X GAA AUGAUUGA	UCAAUCAUU AUGGACCC
30 2424	UGGGGUCCA CUGAUGA X GAA AAUGAUUG	CAAUCAUUA UGGACCCA
2441	UCCAGGGG CUGAUGA X GAA ACUUCAUC	GAUGAAGUU CCCUGGGA
2442	AUCCAGGG CUGAUGA X GAA AACUUCAU	AUGAAGUUC CCCUGGGAU
2473	UGGCAUCA CUGAUGA X GAA AGGGCAGC	GCUGCCUA UGAUGCCA

2494	CCCGUGCA CUGAUGA X GAA ACUCCCAC	GUGGGAGUU UGCACGGG
2495	UCCCGUGC CUGAUGA X GAA AACUCCCA	UGGGAGUUU GCACGGGA
2516	GAUUUGCC CUGAUGA X GAA AGUUUCAG	CUGAAACUA GGCAAUC
2524	UUCCGAGC CUGAUGA X GAA AUUUGCCU	AGGCAAAUC GCUCGGAA
5	2528 CCUCUUCC CUGAUGA X GAA AGCGAUUU	AAAUCGCUC GGAAGAGG
	2541 UUUCCCCA CUGAUGA X GAA AGCCCCUC	GAGGGGCUU UUGGGAAA
	2542 CUUCCCCA CUGAUGA X GAA AAGCCCCU	AGGGGCUUU UGGGAAAG
	2543 ACUUUCCC CUGAUGA X GAA AAAGCCCC	GGGGCUUUU GGGAAAGU
	2552 GCUUGAAC CUGAUGA X GAA ACUUUCCC	GGGAAAGUC GUUCAAGC
10	2555 GAGGCUUG CUGAUGA X GAA ACGACUUU	AAAGUCGUU CAAGCCUC
	2556 AGAGGCUU CUGAUGA X GAA AACGACUU	AAGUCGUUC AAGCCUCU
	2563 CAA AUGCA CUGAUGA X GAA AGGCUUGA	UCAAGCCUC UGCAUUUG
	2569 UAAUGCCA CUGAUGA X GAA AUGCAGAG	CUCUGCAUU UGGCAUUA
	2570 UUAAUGCC CUGAUGA X GAA AAUGCAGA	UCUGCAUUU GGCAUUA
15	2576 GAUUUCUU CUGAUGA X GAA AUGCCAAA	UUUGGCAUU AAGAAAUC
	2577 UGAUUUCU CUGAUGA X GAA AAUGCCAA	UUGGCAUUA AGAAAUC
	2584 AGGUGGGU CUGAUGA X GAA AUUUCUUA	UAAGAAAUC ACCCACCU
	2617 CCUCUUUC CUGAUGA X GAA ACAUCUUC	GAAGAUGUU GAAAGAGG
	2644 GAGCUUUG CUGAUGA X GAA ACUCACUG	CAGUGAGUA CAAAGCUC
20	2652 GGUCAUCA CUGAUGA X GAA AGCUUUGU	ACAAAGCUC UGAUGACC
	2666 AAGAUCUU CUGAUGA X GAA AGUUCGGU	ACCGAACUC AAGAUCUU
	2672 UGGGUCAA CUGAUGA X GAA AUCUUGAG	CUCAAGAUC UUGACCCA
	2674 UGUGGGUC CUGAUGA X GAA AGAUCUUG	CAAGAUCUU GACCCACA
	2684 UGAUGGCC CUGAUGA X GAA AUGUGGGU	ACCCACAUCA GGCCAUCA
25	2691 AUUCAGAU CUGAUGA X GAA AUGGCCGA	UCGGCCAUC AUCUGAAU
	2694 CACAUUCA CUGAUGA X GAA AUGAUGGC	GCCAUCAU CUGAAUGUG
	2705 AGGAGGUU CUGAUGA X GAA ACCACAUU	AAUGUGGUU AACCUCCU
	2706 CAGGAGGU CUGAUGA X GAA AACCCACAU	AUGUGGUUA ACCUCCUG
	2711 GCUCCCAG CUGAUGA X GAA AGGUUAAC	GUUAACCUC CUGGGAGC
30	2742 CACCAUCA CUGAUGA X GAA AGGCCUC	GAGGGCCUC UGAUGGUG
	2753 UAUUCCAC CUGAUGA X GAA AUCACCAU	AUGGUGAU CUGGAAUA
	2761 AUUUGCAG CUGAUGA X GAA AUUCCACG	CGUGGAAUA CUGCAAUA
	2770 GGUUUCCG CUGAUGA X GAA AUUUGCAG	CUGCAAUA CGGAAACC

2782	GGUAGUUG CUGAUGA X GAA ACAGGUUU	AAACCUGUC CAACUACC
2788	UCUUGAGG CUGAUGA X GAA AGUUGGAC	GUCCAACUA CCUCAAGA
2792	UUGCUCUU CUGAUGA X GAA AGGUAGUU	AACUACCUC AAGAGCAA
2809	GACAGAAU CUGAUGA X GAA AGUCACGU	ACGUGACUU AUUCUGUC
5	2810 AGACAGAA CUGAUGA X GAA AAGUCACG	CGUGACUUA UUCUGUCU
	2812 UGAGACAG CUGAUGA X GAA AUAAGUCA	UGACUUAUU CUGUCUCA
	2813 UUGAGACA CUGAUGA X GAA AAUAAGUC	GACUUAUUC UGUCUCAA
	2817 CUUGUUGA CUGAUGA X GAA ACAGAAUA	UAUUCUGUC UCAACAAG
	2819 UCCUUGUU CUGAUGA X GAA AGACAGAA	UUCUGUCUC AACAAAGGA
10	2836 CCAUAUGC CUGAUGA X GAA AGGCUGCG	CGCAGCCUU GCAUAUGG
	2841 GAGCUCCA CUGAUGA X GAA AUGCAAGG	CCUUGCAUA UGGAGCUC
	2849 UCUUUCUU CUGAUGA X GAA AGCUCCAU	AUGGAGCUC AAGAAAGA
	2900 ACACUGUC CUGAUGA X GAA AGGCGGGG	CCCCGCCUA GACAGUGU
	2909 GAGCUGCU CUGAUGA X GAA ACACUGUC	GACAGUGUC AGCAGCUC
15	2917 UGACACUU CUGAUGA X GAA AGCUGCG	CAGCAGCUC AAGUGUCA
	2924 GAGCUGGU CUGAUGA X GAA ACACUUGA	UCAAGUGUC ACCAGCUC
	2932 GGAAGCUG CUGAUGA X GAA AGCUGGUG	CACCAGCUC CAGCUUCC
	2938 CUUCAGGG CUGAUGA X GAA AGCUGGAG	CUCCAGCUU CCCUGAAG
	2939 UCUUCAGG CUGAUGA X GAA AAGCUGGA	UCCAGCUUC CCUGAAGA
20	2982 CUCACUGU CUGAUGA X GAA AUCCUCGU	ACGAGGAUU ACAGUGAG
	2983 UCUCACUG CUGAUGA X GAA AAUCCUCG	CGAGGAUUUA CAGUGAGA
	2993 UGCUUGGA CUGAUGA X GAA AUCUCACU	AGUGAGAUC UCCAAGCA
	2995 GCUGCUUG CUGAUGA X GAA AGAUCUCA	UGAGAUCUC CAAGCAGC
	3008 UCCAUGGU CUGAUGA X GAA AGGGCGUG	CAGCCCCUC ACCAUGGA
25	3026 CUGUAGGA CUGAUGA X GAA AUCAGGUC	GACCUGAUU UCCUACAG
	3027 ACUGUAGG CUGAUGA X GAA AAUCAGGU	ACCUGAUUU CCUACAGU
	3028 AACUGUAG CUGAUGA X GAA AAAUCAGG	CCUGAUUUC CUACAGUU
	3031 GGAAACUG CUGAUGA X GAA AGGAAAUC	GAUUUCCUA CAGUUUCC
	3036 CACUUGGA CUGAUGA X GAA ACUGUAGG	CCUACAGUU UCCAAGUG
30	3037 CCACUUGG CUGAUGA X GAA AACUGUAG	CUACAGUUU CCAAGUGG
	3038 GCCACUUG CUGAUGA X GAA AAACUGUA	UACAGUUUC CAAGUGGC
	3061 AGGACAGA CUGAUGA X GAA ACUCCAUG	CAUGGAGUU UCUGUCCU
	3062 GAGGACAG CUGAUGA X GAA AACUCCAU	AUGGAGUUU CUGUCCUC

3063	GGAGGACA CUGAUGA X GAA AAACUCCA	UGGAGUUUC UGUCCUCC
3067	UUCUGGAG CUGAUGA X GAA ACAGAAAC	GUUUCUGUC CUCCAGAA
3070	ACUUUCUG CUGAUGA X GAA AGGACAGA	UCUGUCCUC CAGAAAGU
3083	UCCCAGAUG CUGAUGA X GAA AUGCACUU	AAGUGCAUU CAUCGGGA
5 3084	GUCCCGAU CUGAUGA X GAA AAUGCACU	AGUGCAUC AUCGGGAC
3087	CAGGUCCC CUGAUGA X GAA AUGAAUGC	GCAUUCAUC GGGACCUG
3110	GAUAAAAG CUGAUGA X GAA AUGUUUCU	AGAAACAUCAUC CUUUUAUC
3113	UCAGAUAA CUGAUGA X GAA AGGAUGUU	AACAUCCUUU UUAUCUGA
3114	CUCAGAUAA CUGAUGA X GAA AAGGAUGU	ACAUCCUUU UAUCUGAG
10 3115	UCUCAGAU CUGAUGA X GAA AAAGGAUG	CAUCCUUUU AUCUGAGA
3116	UUCUCAGA CUGAUGA X GAA AAAAGGAU	AUCCUUUUUA UCUGAGAA
3118	UGUUCUCA CUGAUGA X GAA AUAAAAGG	CCUUUUUAUC UGAGAACCA
3140	AAGUCGCA CUGAUGA X GAA AUCUUCAC	GUGAAGAUU UGCGACUU
3141	AAAGUCGC CUGAUGA X GAA AAUCUUCA	UGAAGAUUU GCGACUUU
15 3148	CCAGGCCA CUGAUGA X GAA AGUCGCAA	UUGCGACUU UGGCCUGG
3149	GCCAGGCC CUGAUGA X GAA AAGUCGCA	UGCGACUUU GGCCUGGC
3165	CUUUAAAA CUGAUGA X GAA AUCCCGGG	CCCGGGAAUA UUUUAAG
3167	UUCUUUA CUGAUGA X GAA AUAUCCCG	CGGGAUAUU UAUAAAGAA
3168	GUUCUUAU CUGAUGA X GAA AAUAUCCC	GGGAUAUUU AUAAAGAAC
20 3169	GGUUCUUA CUGAUGA X GAA AAAUAUCC	GGAUAUUUUA UAAGAACCC
3171	AGGGUUCU CUGAUGA X GAA AUAAAUAU	AUAAUUUAAGAACCU
3183	CCUCACAU CUGAUGA X GAA AUCAGGGU	ACCCUGAUU AUGUGAGG
3184	UCCUCACA CUGAUGA X GAA AAUCAGGG	CCCGUGAUUA UGUGAGGA
3201	AAGUCGAG CUGAUGA X GAA AUCUCCUC	GAGGAGAUUA CUCGACUU
25 3204	GGGAAGUC CUGAUGA X GAA AGUAUCUC	GAGAUACUC GACUUCCC
3209	UUUAGGGG CUGAUGA X GAA AGUCGAGU	ACUCGACUU CCCUAAA
3210	UUUUAGGG CUGAUGA X GAA AAGUCGAG	CUCGACUUC CCCUAAAA
3215	AUCCAUUU CUGAUGA X GAA AGGGGAAG	CUUCCCCUA AAAUGGAU
3228	GGAUUCAG CUGAUGA X GAA AGCCAUC	GGGAUGGCUC CUGAAUCC
30 3235	CAAAGAUG CUGAUGA X GAA AUUCAGGA	UCCUGAAUC CAUCUUUG
3239	UUGUCAAA CUGAUGA X GAA AUGGAUUC	GAAUCCCAUC UUUGACAA
3241	CCUUGUCA CUGAUGA X GAA AGAUGGAU	AUCCAUCUU UGACAAGG
3242	ACCUJUGUC CUGAUGA X GAA AAGAUGGA	UCCAUCUUU GACAAGGU

3251	GUGCUGUA CUGAUGA X GAA ACCUUGUC	GACAAGGUC UACAGCAC
3253	UGGUGGCUG CUGAUGA X GAA AGACCUUG	CAAGGUCUA CAGCACCA
3277	CGCCAUAG CUGAUGA X GAA ACCACACA	UGUGUGGGUC CUAUGGCG
3280	ACACGCCA CUGAUGA X GAA AGGACCAC	GUGGUCCUA UGGCGUGU
5	3289 CCCACAGC CUGAUGA X GAA ACACGCCA	UGGCGUGUU GCUGUGGG
3302	AAGGAGAA CUGAUGA X GAA AUCUCCA	UGGGAGAUC UUCUCCUU
3304	CUAAGGAG CUGAUGA X GAA AGAUCUCC	GGAGAUCUU CUCCUUAG
3305	CCUAAGGA CUGAUGA X GAA AAGAUCUC	GAGAUCUUC UCCUUAGG
3307	CCCCUAAG CUGAUGA X GAA AGAAGAUC	GAUCUUCUC CUUAGGGG
10	3310 AACCCCCU CUGAUGA X GAA AGGAGAAG	CUUCUCUU AGGGGUU
3311	GAACCCCC CUGAUGA X GAA AAGGAGAA	UUCUCCUUA GGGGGUUC
3318	GUAUUGGAG CUGAUGA X GAA ACCCCUA	UAGGGGUU CUCCAUAC
3319	GGUAUGGA CUGAUGA X GAA AACCCCCU	AGGGGGUUC UCCAUACC
3321	UGGGUAUG CUGAUGA X GAA AGAACCCC	GGGGUUCUC CAUACCCA
15	3325 CUCCUGGG CUGAUGA X GAA AUGGAGAA	UUCUCCAUUA CCCAGGAG
3352	GGCUGCAG CUGAUGA X GAA AGUCUUC	UGAAGACUU CUGCAGCC
3353	CGGCUGCA CUGAUGA X GAA AAGUCUUC	GAAGACUUC UGCAGCCG
3397	GUGUGGCA CUGAUGA X GAA ACUCCGGG	CCCGGAGUA UGCCACAC
3413	AUUJUGGU CUGAUGA X GAA AUUUCAGG	CCUGAAAUC UACCAAAU
20	3415 UGAUUUJGG CUGAUGA X GAA AGAUUUC	UGAAAUCUA CCAAUA
3422	UCCAACAU CUGAUGA X GAA AUUUGGU	UACCAAAUC AUGUUGGA
3427	AGCAAUCC CUGAUGA X GAA ACAUGAUU	AAUCAUGUU GGAIUGC
3432	GUGCCAGC CUGAUGA X GAA AUCCAACA	UGUUGGAAU GCUGGCAC
3466	GUUCAGCA CUGAUGA X GAA ACCGGGGC	GCCCCGGUU UGCUGAAC
25	3467 AGUUCAGC CUGAUGA X GAA AACCGGGG	CCCCGGUUU GCUGAACU
3476	UUCUCCAC CUGAUGA X GAA AGUUCAGC	GCUGAACUU GUGGAGAA
3488	AGGUUCACC CUGAUGA X GAA AGUUUCUC	GAGAAACUU GGUGACCU
3500	UUGGCUUG CUGAUGA X GAA AGCAGGUC	GACCUGCUU CAAGCCAA
3501	GUUGGCUU CUGAUGA X GAA AAGCAGGU	ACCUGCUUC AAGCCAAC
30	3512 UCCUGUUG CUGAUGA X GAA ACGUUGGC	GCCAACGUC CAACAGGA
3531	GGGGAUGU CUGAUGA X GAA AUCUUUCC	GGAAAGAUU ACAUCCCC
3532	GGGGGAUG CUGAUGA X GAA AAUCUUUC	GAAAGAUUA CAUCCCCC
3536	UUGAGGGG CUGAUGA X GAA AUGUAAUC	GAUUACAUC CCCCUCAA

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	3542	AUGGCAUU CUGAUGA X GAA AGGGGAU	AUCCCCCUC AAUGCCAU
	3551	CUAGUCAG CUGAUGA X GAA AUGGCAUU	AAUGCCAUA CUGACUAG
	3558	ACUGUUUC CUGAUGA X GAA AGUCAGUA	UACUGACUA GAAACAGU
	3567	UGUGAAGC CUGAUGA X GAA ACUGUUUC	GAAACAGUA GCUUCACA
5	3571	AGUAUGUG CUGAUGA X GAA AGCUACUG	CAGUAGCUU CACAUACU
	3572	GAGUAUGU CUGAUGA X GAA AAGCUACU	AGUAGCUUC ACAUACUC
	3577	GGGUUCGAG CUGAUGA X GAA AUGUGAAG	CUUCACAUUA CUCGACCC
	3580	UGGGGGUC CUGAUGA X GAA AGUAUGUG	CACAUACUC GACCCCCA
	3592	CCUCAGAG CUGAUGA X GAA AGGUGGGG	CCCCACCUU CUCUGAGG
10	3593	UCCUCAGA CUGAUGA X GAA AAGGUGGG	CCCACCUUC UCUGAGGA
	3595	GGUCCUCA CUGAUGA X GAA AGAAGGUG	CACCUUCUC UGAGGACC
	3605	UCCUUGAA CUGAUGA X GAA AGGUCCUC	GAGGACCUU UUCAAGGA
	3606	GUCCUUGA CUGAUGA X GAA AAGGUCCU	AGGACCUUU UCAAGGAC
	3607	CGUCCUUG CUGAUGA X GAA AAAGGUCC	GGACCUUUU CAAGGACG
15	3608	CCGUCCUU CUGAUGA X GAA AAAAGGUC	GACCUUUUC AAGGACGG
	3619	GAUCUGCA CUGAUGA X GAA AGCCGUCC	GGACGGCUU UGCAGAUC
	3620	GGAUCUGC CUGAUGA X GAA AAGCCGUC	GACGGCUUU GCAGAUCC
	3627	AAAUGUG CUGAUGA X GAA AUCUGCAA	UUGCAGAUC CACAUUU
	3633	GGAAUGAA CUGAUGA X GAA AUGUGGAU	AUCCACAUU UUCAUUCC
20	3634	CGGAAUGA CUGAUGA X GAA AAUGUGGA	UCCACAUUU UCAUUCGG
	3635	CCGGAAUG CUGAUGA X GAA AAAUGUGG	CCACAUUUU CAUUCCGG
	3636	UCCGGAAU CUGAUGA X GAA AAAAUGUG	CACAUUUUC AUUCCGGA
	3639	GCUUCCGG CUGAUGA X GAA AUGAAAAU	AUUUJCAUU CCGGAAGC
	3640	AGCUUCCG CUGAUGA X GAA AAUGAAAA	UUUJCAUUC CGGAAGCU
25	3649	CAUCAUCA CUGAUGA X GAA AGCUUCCG	CGGAAGCUC UGAUGAUG
	3664	CGUUUACA CUGAUGA X GAA AUCUCACA	UGUGAGAUA UGUAAACG
	3668	AAAGCGUU CUGAUGA X GAA ACAUAUCU	AGAUUAUGUA AACGCUUU
	3675	GAAUUJUGA CUGAUGA X GAA AGCGUUUA	UAAACGCUU UCAAAUUC
	3676	UGAAUUJUG CUGAUGA X GAA AAGCGUUU	AAACGCUUU CAAAUUCA
30	3677	AUGAAUUU CUGAUGA X GAA AAAGCGUU	AACGCUUUC AAAUCAU
	3682	GGCUCAUG CUGAUGA X GAA AUJUGAAA	UUUCAAAUJ CAUGAGCC
	3683	AGGCUCAU CUGAUGA X GAA AAUUGAA	UUCAAAUUC AUGAGCCU
	3701	AAGGUUUU CUGAUGA X GAA AUUCUUUC	GAAAGAAUC AAAACCUU

	3709	GCUCCUCA CUGAUGA X GAA AGGUUUUG	CAAAACCUU UGAGGAGC
	3710	AGCUCCUC CUGAUGA X GAA AAGGUUUU	AAAACCUUU GAGGAGCU
	3719	UUCGGUGA CUGAUGA X GAA AGCUCUC	GAGGAGCUU UCACCGAA
	3720	GUUCGGUG CUGAUGA X GAA AAGCUCCU	AGGACCUUU CACCGAAC
5	3721	AGUUCGGU CUGAUGA X GAA AAAGCUCC	GGAGCUUUC ACCGAACU
	3730	UGGAGGUG CUGAUGA X GAA AGUUCGGU	ACCGAACUC CACCUCCA
	3736	CAAACAUG CUGAUGA X GAA AGGUGGAG	CUCCACCUC CAUGUUUG
	3742	AGUCCUCA CUGAUGA X GAA ACAUGGAG	CUCCAUGUU UGAGGACU
	3743	UAGUCCUC CUGAUGA X GAA AACAUAGGA	UCCAUGUUU GAGGACUA
10	3751	CCAGCUGA CUGAUGA X GAA AGUCCUCA	UGAGGACUA UCAGCUGG
	3753	GUCCAGCU CUGAUGA X GAA AUAGUCCU	AGGACUAUC AGCUGGAC
	3765	CAGAGUGC CUGAUGA X GAA AGUGUCCA	UGGACACUA GCACUCUG
	3771	GCCCAGCA CUGAUGA X GAA AGUGCUAG	CUAGCACUC UGCUGGGC
	3781	GCAAGGGG CUGAUGA X GAA AGCCCAGC	GCUGGGCUC CCCUUGC
15	3787	GCUUCAGC CUGAUGA X GAA AGGGGGAG	CUCCCCUU GCUGAAGC
	3799	UCCAGGUG CUGAUGA X GAA ACCGCUUC	GAAGCGGUU CACCUGGA
	3800	GUCCAGGU CUGAUGA X GAA AACCGCUU	AAGCGGUUC ACCUGGAC
	3829	UCUUCAUG CUGAUGA X GAA AGGCCUUG	CAAGGCCUC CAUGAAGA
	3839	CUCAAGUC CUGAUGA X GAA AUCUUCAU	AUGAAGAUA GACUJUGAG
20	3844	CUAUUCUC CUGAUGA X GAA AGUCUAUC	GAUAGACUU GAGAAUAG
	3851	UUACUCGC CUGAUGA X GAA AUUCUCAA	UUGAGAAUA GCGAGUAA
	3858	CUUGCUUU CUGAUGA X GAA ACUCGCUA	UAGCGAGUA AAAGCAAG
	3878	AGAUCGGA CUGAUGA X GAA AGUCCCGC	GCAGGGACUU UCCGAUCU
	3879	CAGAUCGG CUGAUGA X GAA AAGUCCCG	CGGGACUUU CCGAUCUG
25	3880	GCAGAUCG CUGAUGA X GAA AAAGUCCC	GGGACUUUC CGAUCUGC
	3885	CCUCGGCA CUGAUGA X GAA AUCGGAAA	UUUCCGAUC UGCCGAGG
	3901	AGAAGCAG CUGAUGA X GAA AGCUGGGC	GCCCAGCUU CUGCUUCU
	3902	GAGAAGCA CUGAUGA X GAA AAGCUGGG	CCCAGCUUC UGCUUCUC
	3907	AGCUGGGAG CUGAUGA X GAA AGCAGAAAG	CUUCUGCUU CUCCAGCU
30	3908	CAGCUGGA CUGAUGA X GAA AAGCAGAA	UUCUGCUUC UCCAGCUG
	3910	CACAGCUG CUGAUGA X GAA AGAAGCAG	CUGCUUCUC CAGCUGUG
	3926	ACGGGCCU CUGAUGA X GAA AUGUGGCC	GGCCACAUUC AGGCCCGU
	3949	CCAGCUCA CUGAUGA X GAA AUUCAUCG	CGAUGAAUC UGAGCUGG

3967	AACAGCAG CUGAUGA X GAA ACUCCUU	AAAGGAGUC CUGCUGUU
3975	GGGUGGGAG CUGAUGA X GAA ACAGCAGG	CCUGCUGUU CUCCACCC
3976	GGGGUGGA CUGAUGA X GAA AACAGCAG	CUGGCUGUUC UCCACCCC
3978	UGGGGGUG CUGAUGA X GAA AGAACACG	GCUGUUCUC CACCCCCA
5 3991	CGGAGUUG CUGAUGA X GAA AGUCUGGG	CCCAGACUA CAACUCCG
3997	ACACCACG CUGAUGA X GAA AGUJGUAG	CUACAACUC CGUGGUGU
4006	AGGAGUAC CUGAUGA X GAA ACACCACG	CGUGGUGUU GUACUCCU
4009	GGGAGGGAG CUGAUGA X GAA ACAACACC	GGUGUUGUA CUCCUCCC
4012	GCGGGGAG CUGAUGA X GAA AGUACAAC	GUUGUACUC CUCCCCGC
10 4015	CGGGCGGG CUGAUGA X GAA AGGAGUAC	GUACUCCUC CCCGCCCCG
4027	AGAACCUU CUGAUGA X GAA AGGCCGGC	GCCCCGCCUA AAGCUUCU
4033	CUGGUGAG CUGAUGA X GAA AGCUUUAG	CUAAAGCUU CUCACCAG
4034	GCUGGUGA CUGAUGA X GAA AAGCUUUA	UAAAGCUUC UCACCAGC
4036	GGGCUGGU CUGAUGA X GAA AGAACUU	AAGCUUCUC ACCAGCCC
15 4066	AUGUAUAA CUGAUGA X GAA ACUGUCAG	CUGACAGUA UUAUACAU
4068	AGAUGUAU CUGAUGA X GAA AUACUGUC	GACAGUAUU AUACAUCU
4069	UAGAUGUA CUGAUGA X GAA AAUACUGU	ACAGUAUUA UACAUCUA
4071	CAUAGAUG CUGAUGA X GAA AUAAUACU	AGUAUUUAU CAUCUAUG
4075	AACUCAUA CUGAUGA X GAA AUGUAUAA	UUAUACAUC UAUGAGUU
20 4077	UAAAUCUA CUGAUGA X GAA AGAUGUAU	AUACAUCAUA UGAGUUUA
4083	UAGGUGUA CUGAUGA X GAA ACUCAUAG	CUAUGAGUU UACACCUA
4084	AUAGGUGU CUGAUGA X GAA AACUCAUA	UAUGAGUUU ACACCUAU
4085	AAUAGGUG CUGAUGA X GAA AAACUCAU	AUGAGUUUA CACCUAUU
4091	GAGCGGAA CUGAUGA X GAA AGGUGUAA	UUACACCUA UUCCGCUC
25 4093	UGGAGCGG CUGAUGA X GAA AUAGGUGU	ACACCUAUU CCGCUCCA
4094	GUGGAGCG CUGAUGA X GAA AAUAGGUG	CACCUAUUC CGCUCCAC
4099	CUCCUGUG CUGAUGA X GAA AGCGGAAU	AUUCCGCUC CACAGGAG
4117	GUCACGAA CUGAUGA X GAA AGCAGCUG	CAGCUGCUU UUCGUGAC
4118	GGUCACGA CUGAUGA X GAA AAGCAGCU	AGCUGCUUU UCGUGACC
30 4119	AGGUACACG CUGAUGA X GAA AAAGCAGC	GCUGCUUUU CGUGACCU
4120	AAGGUACAC CUGAUGA X GAA AAAAGCAG	CUGCUUUUC GUGACCUU
4128	CACGAUUA CUGAUGA X GAA AGGUACAG	CGUGACCUU UAAUCGUG
4129	GCACGAUU CUGAUGA X GAA AAGGUAC	GUGACCUUU AAUCGUGC

4130	AGCACGAU CUGAUGA X GAA AAAGGUCA	UGACCUUUA AUCGUGCU
4133	AAAAGCAC CUGAUGA X GAA AUUAAAAGG	CCUUUAAAUC GUGCUUUU
4139	AAACAAAA CUGAUGA X GAA AGCACGAU	AUCGUGCUU UUUUGUUU
4140	AAAACAAA CUGAUGA X GAA AAGCACGA	UCGUGCUUU UUUGUUU
5 4141	AAAAACAA CUGAUGA X GAA AAAGCACG	CGUGCUUUU UUGUUUUU
4142	AAAAAAACA CUGAUGA X GAA AAAAGCAC	GUGCUUUUU UGUUUUUU
4143	CAAAAAAAC CUGAUGA X GAA AAAAGCA	UGCUUUUUU GUUUUUUG
4146	AAACAAAA CUGAUGA X GAA ACAAAAAA	UUUUUUGUU UUUUGUUU
4147	AAAACAAA CUGAUGA X GAA AACAAAAA	UUUUUUGUUU UUUGUUU
10 4148	CAAAACAA CUGAUGA X GAA AAACAAA	UUUJGUUUU UUGUUUUG
4149	ACAAAACA CUGAUGA X GAA AAAACAA	UUJGUUUUU UGUUUUGU
4150	AACAAAAC CUGAUGA X GAA AAAACAA	UUGUUUUUU GUUUUGUU
4153	ACAAACAA CUGAUGA X GAA ACAAAAAA	UUUUUUGUU UUGUUUGU
4154	AACAAACA CUGAUGA X GAA AACAAAAA	UUUUUUGUU UGUUUGUU
15 4155	CAACAAAC CUGAUGA X GAA AAACAAA	UUUJGUUUU GUUUGUUG
4158	CAACAAACA CUGAUGA X GAA ACAAAACA	UGUUUUGUU UGUUGUUG
4159	GCAACAAAC CUGAUGA X GAA AACAAAAC	GUUUUUGUUU GUUGUUGC
4162	ACAGCAAC CUGAUGA X GAA ACAACCAA	UUGUUUJGUU GUUGCUGU
4165	AAAACAGC CUGAUGA X GAA ACAACAAA	UUJGUUGUU GCUGUUUU
20 4171	UUAGUCAA CUGAUGA X GAA ACAGCAAC	GUUGCUGUU UUGACUAA
4172	GUUAGUCA CUGAUGA X GAA AACAGCAA	UUGCUGUUU UGACUAAC
4173	UGUUAGUC CUGAUGA X GAA AAACAGCA	UGCUGUUUU GACUAACA
4178	AUUCUUGU CUGAUGA X GAA AGUAAAA	UUUJGACTA ACAAGAAU
4189	ACUGGGGU CUGAUGA X GAA ACAUUCU	AAGAAUGUA ACCCCAGU
25 4198	ACGUCACU CUGAUGA X GAA ACUGGGGU	ACCCCAGUU AGUGACGU
4199	CACGUCAC CUGAUGA X GAA AACUGGGG	CCCCAGUUA GUGACGUG
4216	AACAAUAG CUGAUGA X GAA AUUCUUCA	UGAAGAAUA CUAUJGUU
4219	UCUAACAA CUGAUGA X GAA AGUAUUCU	AGAAUACUA UUGUUAGA
4221	UCUCUAAC CUGAUGA X GAA AUAGUAAU	AAUACUAAU GUJAGAGA
30 4224	AUUCUCU CUGAUGA X GAA ACAAUAGU	ACUAUJGUU AGAGAAAU
4225	GAUUUCUC CUGAUGA X GAA AACAAUAG	CUAUUGUUA GAGAAAUC
4233	GCGGGGGG CUGAUGA X GAA AUUUCUCU	AGAGAAAUC CCCCCCGC
4249	GUUACCCU CUGAUGA X GAA AGGCCUUG	CAAAGCCUC AGGGUAAC

	4255	GUCCAGGU CUGAUGA X GAA ACCCUGAG	CUCAGGGUA ACCUGGAC
	4282	GGUCGCCA CUGAUGA X GAA AGGCACCU	AGGUGCCUC UGGCGACC
	4323	GCUGCAGG CUGAUGA X GAA AGGGUGGG	CCCACCCUC CCUGCAGC
	4341	ACUGCCUC CUGAUGA X GAA AGUCCCAC	GUGGGACUA GAGGCAGU
5	4350	AAUGGGCU CUGAUGA X GAA ACUGCCUC	GAGGCAGUA AGCCCAUU
	4358	CAUGAGCU CUGAUGA X GAA AUGGGCUU	AAGCCCAUU AGCUCAUG
	4359	CCAUGAGC CUGAUGA X GAA AAUGGGCU	AGCCCAUUA GCUCAUGG
	4363	GCAGCCAU CUGAUGA X GAA AGCUAAUG	CAUUAGCUC AUGGCUGC
	4387	GAGAGACA CUGAUGA X GAA AGCAGGUC	GACCUGCUC UGUCUCUC
10	4391	AUAAGAGA CUGAUGA X GAA ACAGAGCA	UGCUCUGUC UCUCUUAU
	4393	CCAUAAGA CUGAUGA X GAA AGACAGAG	CUCUGUCUC UCUUAUGG
	4395	CUCCAUAA CUGAUGA X GAA AGAGACAG	CUGUCUCUC UUAUGGAG
	4397	UCCUCCAU CUGAUGA X GAA AGAGAGAC	GUCUCUU AUGGAGGA
	4398	UUCCUCCA CUGAUGA X GAA AAGAGAGA	UCUCUUA UGGAGGAA
15	4445	GCAUCCCA CUGAUGA X GAA AGCCUUUU	AAAAGGCUU UGGGAUGC
	4446	CGCAUCCC CUGAUGA X GAA AAGCCUUU	AAAGGCUUU GGGAUGCG
	4456	ACAGGACG CUGAUGA X GAA ACGCAUCC	GGAUGCGUC CGUCCUGU
	4460	CUCCACAG CUGAUGA X GAA ACGGACGC	GCGUCCGUC CUGUGGAG
	4487	GCAUAGCG CUGAUGA X GAA AGCCCCU	AGGGGGCUC CGCUAUGC
20	4492	AAGUGGCA CUGAUGA X GAA AGCGGAGC	GCUCCGCUA UGCCACUU
	4500	AGUCACUG CUGAUGA X GAA AGUGGCAU	AUGCCACUU CAGUGACU
	4501	AAGUCACU CUGAUGA X GAA AAGUGGCA	UGCCACUUC AGUGACUU
	4509	GGAGUGAG CUGAUGA X GAA AGUCACUG	CAGUGACUU CUCACUCC
	4510	AGGAGUGA CUGAUGA X GAA AAGUCACU	AGUGACUUC UCACUCU
25	4512	CCAGGAGU CUGAUGA X GAA AGAAGUCA	UGACUUUC ACUCCUGG
	4516	GAGGCCAG CUGAUGA X GAA AGUGAGAA	UUCUCACUC CUGGCCUC
	4524	AAACAGCG CUGAUGA X GAA AGGCCAGG	CCUGGCCUC CGCUGUUU
	4531	GGGCCCGA CUGAUGA X GAA ACAGCGGA	UCCCGCUGUU UCGGGCCC
	4532	GGGGCCCCG CUGAUGA X GAA AACAGCGG	CCGCUGUUU CGGGCCCC
30	4533	GGGGGCCCG CUGAUGA X GAA AAACAGCG	CGCUGUUUC GGGCCCCC
	4543	CCUCUUGG CUGAUGA X GAA AGGGGGCC	GGCCCCCUU CCAAGAGG
	4544	ACCUCUUG CUGAUGA X GAA AAGGGGGC	GCCCCCUUC CAAGAGGU
	4553	UGCUCUGA CUGAUGA X GAA ACCUCUUG	CAAGAGGUA UCAGAGCA

4555	UCUGCUCU CUGAUGA X GAA AUACCUCU	AGAGGUAUC AGAGCAGA
4577	GUCUAGGA CUGAUGA X GAA ACGUCCU	AGGGACGUU UCCUAGAC
4578	GGUCUAGG CUGAUGA X GAA AACGUCCC	GGGACGUUU CCUAGACC
4579	UGGUCUAG CUGAUGA X GAA AAACGUCC	GGACGUUUC CUAGACCA
5 4582	CCCUGGUC CUGAUGA X GAA AGGAAACG	CGUUUCCUA GACCAGGG
4598	UUCCCCGAG CUGAUGA X GAA ACAUGUGC	GCACAUGUU CUCGGGAA
4599	GUUCCCCGA CUGAUGA X GAA AACAUUG	CACAUGUUC UCAGGAAC
4601	UGGUUCCU CUGAUGA X GAA AGAACAU	CAUGUUCUC GGGAACCA
4614	UUAAGAUU CUGAUGA X GAA ACUGUGGU	ACCACAGUU AAUCUUA
10 4615	UUUAAGAU CUGAUGA X GAA AACUGUGG	CCACAGUUA AUCUAAA
4618	AGAUUUAA CUGAUGA X GAA AUUAACUG	CAGUUAUC UUAAAUCU
4620	AAAGAUUU CUGAUGA X GAA AGAUUAAC	GUUAAUCUU AAAUCUU
4621	AAAAGAUU CUGAUGA X GAA AAGAUUAA	UUAUCUUA AAUCUUU
4625	CGGGAAAA CUGAUGA X GAA AUUUAAGA	UCUAAAUC UUUUCCCG
15 4627	CCCGGGAA CUGAUGA X GAA AGAUUUAA	UAAAUCUU UUCCCGGG
4628	UCCCCGGGA CUGAUGA X GAA AAGAUUUA	UAAAUCUUU UCCCGGGAA
4629	CUCCCCGGG CUGAUGA X GAA AAAGAUUU	AAAUCUUU CCCGGGAG
4630	ACUCCCGG CUGAUGA X GAA AAAAGAUU	AAUCUUUC CCGGGAGU
4639	CAACAGAA CUGAUGA X GAA ACUCCCGG	CCGGGAGUC UUCUGUUG
20 4641	GACAACAG CUGAUGA X GAA AGACUCCC	GGGAGUCUU CUGUUGUC
4642	AGACAACA CUGAUGA X GAA AAGACUCC	GGAGUCUUC UGUUGUCU
4646	AAACAGAC CUGAUGA X GAA ACAGAAGA	UCUUCUGUU GUCUGUU
4649	GGUAAACA CUGAUGA X GAA ACAACAGA	UCUGUUGUC UGUUUACC
4653	GGAUGGUA CUGAUGA X GAA ACAGACAA	UUGUCUGUU UACCAUCC
25 4654	UGGAUGGU CUGAUGA X GAA AACAGACA	UGUCUGUU ACCAUCCA
4655	UUGGAUGG CUGAUGA X GAA AAACAGAC	GUCUGUUUA CCAUCCAA
4660	AUGCUUUG CUGAUGA X GAA AUGGUAAA	UUUACCAUC CAAAGCAU
4669	AUGUUAAA CUGAUGA X GAA AUGCUUUG	CAAAGCAUA UUUAACAU
4671	ACAUGUUA CUGAUGA X GAA AUAUGCU	AAGCAUAUU UAACAU
30 4672	CACAUGUU CUGAUGA X GAA AAUAUGCU	AGCAUAUU AACAU
4673	ACACAUGU CUGAUGA X GAA AAAUAUGC	GCAUAUUUA ACAUGUGU
4682	CCCCCACU CUGAUGA X GAA ACACAUGU	ACAUGUGUC AGUGGGGG
4698	CAGAAGCC CUGAUGA X GAA AGCGCCAC	GUGGCGCUU GGCUUCUG

4703	GGCCUCAG CUGAUGA X GAA AGCCAAGC	GCUUGGCCUU CUGAGGCC
4704	UGGCCUCA CUGAUGA X GAA AAGCCAAG	CUUGGCCUUC UGAGGCCA
4720	GAACUGAU CUGAUGA X GAA AUGGCUCU	AGAGCCAUC AUCAGUUC
4723	GAGGAACU CUGAUGA X GAA AUGAUGGC	GCCAUCAUC AGUUCCUC
5 4727	ACUAGAGG CUGAUGA X GAA ACUGAUGA	UCAUCAGUU CCUCUAGU
4728	CACUAGAG CUGAUGA X GAA AACUGAUG	CAUCAGUUC CUCUAGUG
4731	UCUCACUA CUGAUGA X GAA AGGAACUG	CAGUUCCUC UAGUGAGA
4733	CAUCUCAC CUGAUGA X GAA AGAGGAAC	GUUCCUCUA GUGAGAUG
4745	AUGACCUC CUGAUGA X GAA AUGCAUCU	AGAUGCAUU GAGGUCAU
10 4751	UUGGGUAU CUGAUGA X GAA ACCUCAAU	AUUGAGGUC AUACCCAA
4754	AGCUUGGG CUGAUGA X GAA AUGACCUC	GAGGUCAUA CCCAAGCU
4763	AGGCCUGC CUGAUGA X GAA AGCUUGGG	CCCAAGCUU GCAGGCCU
4777	AGUAUGCG CUGAUGA X GAA AGGUCAAG	CCUGACCUU CGCAUACU
4778	CAGUAUGC CUGAUGA X GAA AAGGUCAAG	CUGACCUUC GCAUACUG
15 4783	GUGAGCAG CUGAUGA X GAA AUGCGAAG	CUUCGCAUA CUGCUCAC
4789	CUCCCCGU CUGAUGA X GAA AGCAGUAU	AUACUGCUC ACGGGGAG
4799	GACCACUU CUGAUGA X GAA ACUCCCCG	CGGGGAGUU AAGUGGUC
4800	GGACCACU CUGAUGA X GAA AACUCCCC	GGGGAGUUA AGUGGUCC
4807	CCAAACUG CUGAUGA X GAA ACCACUUA	UAAGUGGUC CAGUJUGG
20 4812	CUAGGCCA CUGAUGA X GAA ACUGGACC	GGUCCAGUU UGGCCUAG
4813	ACUAGGCC CUGAUGA X GAA AACUGGAC	GUCCAGUUU GGCCUAGU
4819	AACCUUAC CUGAUGA X GAA AGGCCAAA	UUUGGCCUA GUAGGUU
4822	GGCAACCU CUGAUGA X GAA ACUAGGCC	GGCCUAGUA AGGUUGCC
4827	CAGUAGGC CUGAUGA X GAA ACCUUACU	AGUAAGGUU GCCUACUG
25 4832	CCCAUCAG CUGAUGA X GAA AGGCAACC	GGUUGCCUA CUGAUGGG
4843	UGGCUUUU CUGAUGA X GAA AGCCCAUC	GAUGGGCUC AAAAGCCA
4855	CUGUUUAA CUGAUGA X GAA AUGUGGU	AGCCACAUU UAAAACAG
4856	CCUGUUUA CUGAUGA X GAA AAUGUGGC	GCCACAUUU UAAACAGG
4857	ACCUGUUU CUGAUGA X GAA AAAUGUGG	CCACAUUUU AAACAGGU
30 4858	AACCUGUU CUGAUGA X GAA AAAAUGUG	CACAUUUUA AACAGGUU
4866	UGAGAUAA CUGAUGA X GAA ACCUGUUU	AAACAGGUU UUAUCUCA
4867	UUGAGAUAA CUGAUGA X GAA AACCGUUU	AACAGGUUU UAUCUCAA
4868	CUUGAGAU CUGAUGA X GAA AAACCUGU	ACAGGUUUU AUCUCAAG

	4869	ACUUGAGA CUGAUGA X GAA AAAACCUG	CAGGUUUUA UCUCAAGU
	4871	AUACUUGA CUGAUGA X GAA AUAAAACC	GGUUUUUAUC UCAAGUAU
	4873	UAAUACUU CUGAUGA X GAA AGAUAAAA	UUUUAUUCUC AAGUAUUA
	4878	UAAUAUAA CUGAUGA X GAA ACUUGAGA	UCUCAAGUA UUAAUUAUA
5	4880	UAAUAUUU CUGAUGA X GAA AUACUUGA	UCAAGUAUU AAUAUUAUA
	4881	CUAAUAAU CUGAUGA X GAA AAUACUUG	CAAGUAUUA AAUAAUAG
	4884	UGUCUAAU CUGAUGA X GAA AUUAAUAC	GUAAUAAAUA UAUAGACA
	4886	CUUGUCUA CUGAUGA X GAA AAUUAUAA	AUUAUUAUA UAGACAAG
	4888	GUCUUGUC CUGAUGA X GAA AUUAUUA	UAAUUAUA GACAAGAC
10	4900	UAAUGCAU CUGAUGA X GAA AGUGUCUU	AAGACACUU AUGCAUUA
	4901	AUAAUGCA CUGAUGA X GAA AAGUGUCU	AGACACUUA UGCAUUUAU
	4907	AACAGGAU CUGAUGA X GAA AUGCAUAA	UUAUGCAUU AUCCUGUU
	4908	AAACAGGA CUGAUGA X GAA AAUGCAUA	UAUGCAUUA UCCUGUUU
	4910	UAAAACAG CUGAUGA X GAA AUAAUGCA	UGCAUUAUC CUGUUUUUA
15	4915	AUAAUAAA CUGAUGA X GAA ACAGGAUA	UAUCCUGUU UUAUUAU
	4916	GAUAAUAA CUGAUGA X GAA AACAGGAU	AUCCUGUUU UAAUUAUC
	4917	GGAAUAAU CUGAUGA X GAA AAACAGGA	UCCUGUUUU AAUAAUCC
	4918	UGGAUAAA CUGAUGA X GAA AAAACAGG	CCUGUUUUUA UAAUACCA
	4920	AUJUGGAUA CUGAUGA X GAA AUAAAACA	UGUUUUJAUA UAUCCAAU
20	4922	UCAUUGGA CUGAUGA X GAA AUAAAAAA	UUUUUAJUA UCCAAUGA
	4924	AUUCAUUG CUGAUGA X GAA AUAAUAAA	UUAAUUAUC CAAUGAAU
	4933	CCCAGUUA CUGAUGA X GAA AUUCAUUG	CAAUGAAUA UAACUGGG
	4935	GCCCCAGU CUGAUGA X GAA AUAUUCAU	AUGAAUUA ACUGGGGC
	4948	UGACUCUU CUGAUGA X GAA ACUCGCC	GGCGAGUUU AAGAGUCA
25	4949	AUGACUCU CUGAUGA X GAA AACUCGCC	GGCGAGUUA AGAGUCAU
	4955	UAGACCAU CUGAUGA X GAA ACUCUAAA	UUAAGAGUC AUGGCUA
	4961	CUUUUCUA CUGAUGA X GAA ACCAUGAC	GUCAUGGGUC UAGAAAAG
	4963	CCCUUUUC CUGAUGA X GAA AGACCAUG	CAUGGUCUA GAAAAGGG
	4974	UACAGAGA CUGAUGA X GAA ACCCCUUU	AAAGGGGUU UCUCUGUA
30	4975	GUACAGAG CUGAUGA X GAA AACCCUU	AAGGGGUUU CUCUGUAC
	4976	GGUACAGA CUGAUGA X GAA AAACCCU	AGGGGUUJC UCUGUACC
	4978	UGGGUACA CUGAUGA X GAA AGAAACCC	GGGUUUCUC UGUACCCA
	4982	GAUUUGGG CUGAUGA X GAA ACAGAGAA	UUCUCUGUA CCCAAUUC

	4990	ACCAGCCC CUGAUGA X GAA AUUUGGGU	ACCCAAAUC GGGCUGGU
	4999	CUUGGUCC CUGAUGA X GAA ACCAGCCC	GGGCUGGUU GGACCAAG
	5029	GCUGGGAC CUGAUGA X GAA ACCACUCU	AGAGUGGUU GUCCCAGC
	5032	AUAGCUGG CUGAUGA X GAA ACAACCAC	GUGGUJUGUC CCAGCUAU
5	5039	AGUAACUA CUGAUGA X GAA AGCUGGGA	UCCCAGCUA UAGUUACU
	5041	UUAGUAAC CUGAUGA X GAA AUAGCUGG	CCAGCUAUA GUUACUAA
	5044	AGUUUAGU CUGAUGA X GAA ACUAUAGC	GCUAUAGUU ACUAAACU
	5045	UAGUUUAG CUGAUGA X GAA AACUAUAG	CUAUAGUUA CUAAACUA
	5048	GAGUAGUU CUGAUGA X GAA AGUAACUA	UAGUUACUA AACUACUC
10	5053	UGGGUGAG CUGAUGA X GAA AGUUUAGU	ACUAAACUA CUCACCCA
	5056	CUUUGGGU CUGAUGA X GAA AGUAGUUU	AAACUACUC ACCCAAAG
	5066	GAGGUCCC CUGAUGA X GAA ACUUUGGG	CCCAAAGUU GGGACCUC
	5074	AAGCCAGU CUGAUGA X GAA AGGUCCCA	UGGGACCUC ACUGGCCU
	5082	GUAAAGAG CUGAUGA X GAA AGCCAGUG	CACUGGCCU CUCUUUAC
15	5083	AGUAAAGA CUGAUGA X GAA AAGCCAGU	ACUGGCCUUC UCUUUACU
	5085	GAAGUAAA CUGAUGA X GAA AGAAGCCA	UGGCUUCUC UUUACUUC
	5087	AUGAAGUA CUGAUGA X GAA AGAGAACG	GCUUCUCUU UACUUCAU
	5088	GAUGAAGU CUGAUGA X GAA AACAGAACG	CUUCUCUUU ACUUCAU
	5089	UGAUGAAG CUGAUGA X GAA AAAGAGAA	UUCUCUUUA CUUCAUCA
20	5092	CCAUGAUG CUGAUGA X GAA AGUAAAGA	UCUUUACUU CAUCAUGG
	5093	UCCAUGAU CUGAUGA X GAA AAGUAAAG	CUUUACUUC AUCAUGGA
	5096	AAAUCCAU CUGAUGA X GAA AUGAAGUA	UACUUCAUC AUGGAUUU
	5103	GAUGGUGA CUGAUGA X GAA AUCCAUGA	UCAUGGAUU UCACCAUC
	5104	GGAUGGUG CUGAUGA X GAA AAUCCAUG	CAUGGAUUU CACCAUCC
25	5105	GGGAUGGU CUGAUGA X GAA AAAUCCAU	AUGGAUUUC ACCAUCCC
	5111	UGCCUUGG CUGAUGA X GAA AUGGUGAA	UUCACCAUC CCAAGGCA
	5122	UCCUCUCA CUGAUGA X GAA ACUGCCUU	AAGGCAGUC UGAGAGGA
	5134	AUACUCUU CUGAUGA X GAA AGCUCCUC	GAGGAGCUA AAGAGUAU
	5141	UGGGCUGA CUGAUGA X GAA ACUCUUUA	UAAAGAGUA UCAGCCCC
30	5143	UAUGGGCU CUGAUGA X GAA AUACUCUU	AAGAGUAUC AGCCCAUA
	5151	UUAAUAAA CUGAUGA X GAA AUGGCGUG	CAGCCCCAU AUUUAAGC
	5153	GCUUAAAUA CUGAUGA X GAA AUAUGGGC	GCCCCAUUU UAUUAAGC
	5154	UGCUUAAA CUGAUGA X GAA AAUAUGGG	CCCCAUUUU AUUAAGCA

	5155	GUGCUUAA CUGAUGA X GAA AAAUAUGG	CCAUUUUA UUAAGCAC
	5157	AAGUGCUU CUGAUGA X GAA AUAAAUAU	AUAUUUAUU AAGCACUU
	5158	AAAGUGCU CUGAUGA X GAA AAUAAAUA	UAUUUUUA AGCACUUU
	5165	GGAGCAUA CUGAUGA X GAA AGUGCUUA	UAAGCACUU UAUGCUC
5	5166	AGGAGCAU CUGAUGA X GAA AAGUGCUU	AAGCACUUU AUGCUCCU
	5167	AAGGAGCA CUGAUGA X GAA AAAGUGCU	AGCACUUUA UGCUCUU
	5172	GUGCCAAG CUGAUGA X GAA AGCAUAAA	UUUAUGCUC CUJGGCAC
	5175	GCUGUGCC CUGAUGA X GAA AGGAGCAU	AUGCUCCUU GGCACAGC
	5195	GCAUAAAUA CUGAUGA X GAA ACACAUCA	UGAUGUGUA AUUUAUGC
10	5198	CUUGCAUA CUGAUGA X GAA AUUACACA	UGUGUAAUU UAUGCAAG
	5199	GCUUGCAU CUGAUGA X GAA AAUUACAC	GUGUAAUUU AUGCAAGC
	5200	AGCUUGCA CUGAUGA X GAA AAAUUACA	UGUAAUJUA UGCAAGCU
	5209	UGGAGAGG CUGAUGA X GAA AGCUUGCA	UGCAAGCUC CCUCUCCA
	5213	UAGCUGGA CUGAUGA X GAA AGGGAGCU	AGCUCCCCUC UCCAGCUA
15	5215	CCUAGCUG CUGAUGA X GAA AGAGGGAG	CUCCCUCUC CAGCUAGG
	5221	CUGAGUCC CUGAUGA X GAA AGCUGGAG	CUCCAGCUA GGACUCAG
	5227	AAUAUCCU CUGAUGA X GAA AGUCCUAG	CUAGGACUC AGGAUAUU
	5233	UUGACUAA CUGAUGA X GAA AUCCUGAG	CUCAGGAUA UUAGUCAA
	5235	CAUUGACU CUGAUGA X GAA AUAUCCUG	CAGGAUAUU AGUCAAUG
20	5236	UCAUUGAC CUGAUGA X GAA AAUAUCCU	AGGAUAUUA GUCAAUGA
	5239	GGCUCAUU CUGAUGA X GAA ACUAAUAU	AUAUUAGUC AAUGAGCC
	5250	UUCCUUUU CUGAUGA X GAA AUGCUCA	UGAGCCAUC AAAAGGAA
	5273	AAAUAAAGA CUGAUGA X GAA AGGUUUUU	AAAAACCUA UCUUAUUU
	5275	GAAAAUAA CUGAUGA X GAA AUAGGUUU	AAACCUAUC UUAUUUUC
25	5277	AUGAAAAU CUGAUGA X GAA AGAUAGGU	ACCUAUCUU AUUUUCAU
	5278	GAUGAAAA CUGAUGA X GAA AAGAUAGG	CCUAUCUUA UUUUCAUC
	5280	CAGAUGAA CUGAUGA X GAA AUAAGAUA	UAUCUUAUU UUCAUCUG
	5281	ACAGAUGA CUGAUGA X GAA AAUAAGAU	AUCUUAUUU UCAUCUGU
	5282	AACAGAUG CUGAUGA X GAA AAAUAAGA	UCUUAUUUU CAUCUGUU
30	5283	AAACAGAU CUGAUGA X GAA AAAUAAG	CUUAUUUUC AUCUGUUU
	5286	AUGAAACA CUGAUGA X GAA AUGAAAUAU	AUUUUCAUC UGUUUCAU
	5290	AGGUUAUGA CUGAUGA X GAA ACAGAUGA	UCAUCUGUU UCAUACCU
	5291	AAGGUUAUG CUGAUGA X GAA AACAGAUG	CAUCUGUUU CAUACCUU

	5292	CAAGGUUA CUGAUGA X GAA AAACAGAU	AUCUGUUUC AUACCUUG
	5295	AGACAAGG CUGAUGA X GAA AUGAAACA	UGUUUCAUA CCUGUCU
	5299	CCCCAGAC CUGAUGA X GAA AGGUUAUGA	UCAUACCUU GUCUGGGG
	5302	AGACCCCCA CUGAUGA X GAA ACAAGGUA	UACCUUGUC UGGGGUCU
5	5309	CGUCAUUA CUGAUGA X GAA ACCCCAGA	UCUGGGGUC UAAUGACG
	5311	AUCGUCAU CUGAUGA X GAA AGACCCC	UGGGGUCUA AUGACGAU
	5331	CCCAUGUC CUGAUGA X GAA ACCCUGUU	AACAGGGUA GACAUGGG
	5350	CCCUUUUC CUGAUGA X GAA ACCCUGUC	GACAGGGUA GAAAAGGG
	5367	.ACCCCCAAA CUGAUGA X GAA AGCGGGCA	UGCCCGCUC UUUGGGGU
10	5369	AGACCCCCA CUGAUGA X GAA AGAGCGGG	CCCGCUCUU UGGGGUCU
	5370	UAGACCCC CUGAUGA X GAA AAGAGCGG	CCGCUCUUU GGGGUCUA
	5376	CAUCUCUA CUGAUGA X GAA ACCCCAAA	UUJUGGGUC UAGAGAUG
	5378	CUCAUUCU CUGAUGA X GAA AGACCCC	UGGGGUCUA GAGAUGAG
	5395	AUUUUJAGA CUGAUGA X GAA ACCCAGGG	CCCUGGGUC UCUAAAAU
15	5397	CCAUUUUA CUGAUGA X GAA AGACCCAG	CUGGGUCUC UAAAUGG
	5399	AGCCAUUU CUGAUGA X GAA AGAGACCC	GGGUCUCUA AAAUGGCU
	5408	UUCUAAGA CUGAUGA X GAA AGCCAUUU	AAAUGGCUC UCUUAGAA
	5410	ACUUCUAA CUGAUGA X GAA AGAGCCAU	AUGGCUCUC UUAGAAGU
	5412	CAACUUUC CUGAUGA X GAA AGAGAGCC	GGCUCUCUU AGAAGUUG
20	5413	ACAACUUC CUGAUGA X GAA AAGAGAGC	GCUCUCUUA GAAGUUGU
	5419	GCACAUAC CUGAUGA X GAA ACUUCUAA	UUAGAAGUU GUAUGUGC
	5422	UUUGCACA CUGAUGA X GAA ACAACUUC	GAAGUUGUA UGUGCAAA
	5432	CAGACCAU CUGAUGA X GAA AUUUGCAC	GUGCAAUU AUGGUCUG
	5433	ACAGACCA CUGAUGA X GAA AAUJUGCA	UGCAAUUUA UGGUCUGU
25	5438	AGCACACACA CUGAUGA X GAA ACCAUAAU	AUUAUGGUC UGUGUGCU
	5447	CACGACCU CUGAUGA X GAA AGCACACACA	UGUGUGCUU AGGUCGUG
	5448	GCACGACC CUGAUGA X GAA AAGCACAC	GUGUGCUUA GGUCGUGC
	5452	GUGUGCAC CUGAUGA X GAA ACCUAAGC	GUUAGGUC GUGCACAC
	5475	CCAGCUGU CUGAUGA X GAA ACCGGCUC	GAGCCGGUC ACAGCUGG
30	5497	AAAGCAGC CUGAUGA X GAA AUUCAUCG	CGAUGAAUA GCUGCUUU
	5504	CUCUCCCC CUGAUGA X GAA AGCAGCUA	UAGCUGCUU UGGGAGAG
	5505	GCUCUCCC CUGAUGA X GAA AAGCAGCU	AGCUGCUUU GGGAGAGC
	5524	UAAGUGGC CUGAUGA X GAA AGCAUGCU	AGCAUGCUA GCCACUUA

	5531	AGAGAAUU CUGAUGA X GAA AGUGGCUA	UAGCCACUU AAUUCUCU
	5532	CAGAGAAU CUGAUGA X GAA AAGUGGCU	AGCCACUUA AUUCUCUG
	5535	GGUCAGAG CUGAUGA X GAA AUUAAGUG	CACUUAUU CUCUGACC
	5536	CGGUUCAGA CUGAUGA X GAA AUUAAGU	ACUUAUUUC UCUGACCG
5	5538	CCCGGUCA CUGAUGA X GAA AGAAUUA	UUAAAUCUC UGACCGGG
	5554	GUACCAU CUGAUGA X GAA AUGCUGGC	GCCAGCAUC AUGGGUAC
	5561	GGAGCAGG CUGAUGA X GAA ACCCAUGA	UCAUGGGUA CCUGCUC
	5568	ACACAGGG CUGAUGA X GAA AGCAGGU	UACCUGCUC CCCUGUGU
	5577	GGAUGGGG CUGAUGA X GAA ACACAGGG	CCCUGUGUA CCCCAUCC
10	5584	ACCUUAAG CUGAUGA X GAA AUGGGUA	UACCCCAUC CUUAAGGU
	5587	AAAACCUU CUGAUGA X GAA AGGAUGGG	CCCAUCCUU AAGGUUUU
	5588	GAAAACCU CUGAUGA X GAA AAGGAUGG	CCAUCCUUA AGGUUUUC
	5593	AGACAGAA CUGAUGA X GAA ACCUUAAG	CUUAAGGUU UUCUGUCU
	5594	CAGACAGA CUGAUGA X GAA AACCUUAA	UUAAGGUUU UCUGUCUG
15	5595	UCAGACAG CUGAUGA X GAA AAACCUUA	UAAGGUUUU CUGUCUGA
	5596	AUCAGACA CUGAUGA X GAA AAAACCUU	AAGGUUUUC UGUCUGAU
	5600	UCUCAUCA CUGAUGA X GAA ACAGAAAA	UUUUCUGUC UGAUGAGA
	5627	UCAGUGGG CUGAUGA X GAA AUUGCACU	AGUGCAAUC CCCACUGA
	5660	UGCACCAA CUGAUGA X GAA AGCCACAG	CUGUGGCUC UUGGUGCA
20	5662	AGUGCACC CUGAUGA X GAA AGAGCCAC	GUGGCUCUU GGUGCACU
	5671	UGGCUGGU CUGAUGA X GAA AGUGCACC	GGUGCACUC ACCAGCCA
	5685	UACUUGUC CUGAUGA X GAA AGUCCUGG	CCAGGACUA GACAAGUA
	5693	CCCUUUCC CUGAUGA X GAA ACUJUGCU	AGACAAGUA GGAAAGGG
	5704	GUGGCUAG CUGAUGA X GAA AGCCUUU	AAAGGGCUU CUAGCCAC
25	5705	UGUGGCCUA CUGAUGA X GAA AAGCCUU	AAGGGCUUC UAGCCACA
	5707	AGUGUGGC CUGAUGA X GAA AGAAGCCC	GGGCUUCUA GCCACACU
	5731	CCCUACCU CUGAUGA X GAA AUUUJCUU	AAGAAAUC AGGUAGGG
	5736	GCCAGCCC CUGAUGA X GAA ACCUGAU	AAUCAGGUU GGGCUGGC
	5754	UGGACAAA CUGAUGA X GAA AUGUCUU	AAAGACAUUC UUUGUCCA
30	5756	AAUGGACA CUGAUGA X GAA AGAUGUCU	AGACAUUU UGUCCAUU
	5757	GAAUGGAC CUGAUGA X GAA AAGAUGUC	GACAUUUU GUCCAUUC
	5760	UGCGAAUG CUGAUGA X GAA ACAAAAGAU	AUCUUUGUC CAUUCGCA
	5764	CUUUJUGCG CUGAUGA X GAA AUGGACAA	UUGUCCAUU CGCAAAAG

	5765	GCUUUUGC CUGAUGA X GAA AAUGGACA	UGUCCAUUC GCAAAAGC
	5775	GCCGACAA CUGAUGA X GAA AGCUUUUG	CAAAAGCUC UUGUCGGC
	5777	CAGCCGAC CUGAUGA X GAA AGAGCUUU	AAAGCUCUU GUCGGCUG
	5780	CUGCAGCC CUGAUGA X GAA ACAAGAGC	GCUCUUGUC GGCUGCAG
5	5794	GCCUGACU CUGAUGA X GAA ACACACUG	CAGUGUGUA AGUCAGGC
	5798	CAUCGCCU CUGAUGA X GAA ACUUACAC	GUGUAAGUC AGGCGAUG
	5818	UUCUCUGG CUGAUGA X GAA AGCCUCUG	CAGAGGCUA CCAGAGAA
	5852	GGAUGAGA CUGAUGA X GAA ACCUCAGG	CCUGAGGUU UCUCAUCC
	5853	UGGAUGAG CUGAUGA X GAA AACCUUCAG	CUGAGGUUU CUCAUCCA
10	5854	CUGGAUGA CUGAUGA X GAA AAACCUCA	UGAGGUUUC UCAUCCAG
	5856	AUCUGGAU CUGAUGA X GAA AGAAACCU	AGGUUUCUC AUCCAGAU
	5859	GAUAUCUG CUGAUGA X GAA AUGAGAAA	UUUCUCAUC CAGAUUAUC
	5865	UUGCUGGA CUGAUGA X GAA AUCUGGAU	AUCCAGAUUA UCCAGCAA
	5867	AAUUGCUG CUGAUGA X GAA AUAUCUGG	CCAGAUUAUC CAGCAAUU
15	5875	CACCCCCC CUGAUGA X GAA AUUGCUGG	CCAGCAAUU GGGGGGUG
	5896	GGACCAUC CUGAUGA X GAA AUGGUCUU	AAGACCAUA GAUGGUCC
	5903	UAAAACAG CUGAUGA X GAA ACCAUCUA	UAGAUGGUC CUGUAUUA
	5908	CGGAAUAA CUGAUGA X GAA ACAGGACC	GGUCCUGUA UUAUUCCG
	5910	AUCGGAAU CUGAUGA X GAA AUACAGGA	UCCUGUAUU AUUCCGAU
20	5911	AAUCGGAA CUGAUGA X GAA AAUACAGG	CCUGUAUUA UUCCGAUU
	5913	AAAAUCGG CUGAUGA X GAA AUAAUACA	UGUAUUAUU CCGAUUUU
	5914	AAAAAUUCG CUGAUGA X GAA AAUAAUAC	GUAUUAUUC CGAUUUUA
	5919	AUUAAUAA CUGAUGA X GAA AUCGGAAU	AUUCCGAUU UUAAUAAU
	5920	GAUUAAUUA CUGAUGA X GAA AAUCGGAA	UUCCGAUUU UAAUAAUC
25	5921	AGAUUAUU CUGAUGA X GAA AAAUCGGA	UCCGAUUUU AAUAAUCU
	5922	UAGAUUAU CUGAUGA X GAA AAAUCGG	CCGAUUUUUA AUAAUCUA
	5925	AAUUAGAU CUGAUGA X GAA AUUAAAUA	AUUUUAAUA AUCUAAUU
	5928	ACGAAUUA CUGAUGA X GAA AUUAAUAA	UUAAUAAUC UAAUUCGU
	5930	UCACGAAU CUGAUGA X GAA AGAUUAUJ	AAUAAUCUA AUUCGUGA
30	5933	UGAUCACG CUGAUGA X GAA AUUAGAU	AAUCUAAUU CGUGAUCA
	5934	AUGAUCAC CUGAUGA X GAA AAUUAGAU	AUCUAAUUC GUGAUCAU
	5940	CUCUUAAU CUGAUGA X GAA AUCACGAA	UUCGUGAUC AUUAAGAG
	5943	AGUCUCUU CUGAUGA X GAA AUGAUCAC	GUGAUCAUU AAGAGACU

5944	AAGUCUCU CUGAUGA X GAA AAUGAUCA	UGAUCAUUA AGAGACUU
5952	AUUUACUA CUGAUGA X GAA AGUCUCUU	AAGAGACUU UAGUAAA
5953	CAUUUACU CUGAUGA X GAA AAGUCUCU	AGAGACUUU AGUAAAUG
5954	ACAUUUAC CUGAUGA X GAA AAAGUCUC	GAGACUUUA GUAAAUGU
5	5957 GGGACAUU CUGAUGA X GAA ACUAAAGU	ACUUUAGUA AAUGUCCC
	5963 GGAAAAGG CUGAUGA X GAA ACAUUUAC	GUAAAUGUC CCUUUUCC
	5967 UGUGGGAA CUGAUGA X GAA AGGGACAU	AUGUCCCUU UUCCCACA
	5968 UUGUGGG CUGAUGA X GAA AAGGGACA	UGUCCCUUU UCCCACAA
	5969 UUUGUGGG CUGAUGA X GAA AAAGGGAC	GUCCCUUU CCCACAAA
10	5970 UUUUGUGG CUGAUGA X GAA AAAAGGGA	UCCCUUUUC CCACAAAA
	5981 CUUUUCUU CUGAUGA X GAA ACUUUJGU	ACAAAAGUA AAGAAAAG
	5992 AAUCCCGA CUGAUGA X GAA AGCUUUUC	GAAAAGCUA UCGGGAUU
	5994 AGAAUCCC CUGAUGA X GAA AUAGCUUU	AAAGCUAUC GGGAUUCU
	6000 AACCAAGAG CUGAUGA X GAA AUCCCGAU	AUCGGGAUU CUCUGGUU
15	6001 GAACCAGA CUGAUGA X GAA AAUCCCGA	UCGGGAUUC UCUGGUUC
	6003 CAGAACCA CUGAUGA X GAA AGAAUCCC	GGGAUUCUC UGGUUCUG
	6008 UUAAGCAG CUGAUGA X GAA ACCAGAGA	UCUCUGGUU CUGCUUAA
	6009 UUUAAAGCA CUGAUGA X GAA ACCAGAG	CUCUGGUUC UGCUUAAA
	6014 AAGUCUUU CUGAUGA X GAA AGCAGAAC	GUUCUGCUU AAAGACUU
20	6015 UAAGUCUU CUGAUGA X GAA AAGCAGAA	UUCUGGUUA AAGACUUA
	6022 CCAAAGCU CUGAUGA X GAA AGUCUUUA	UAAAGACUU AGCUUUGG
	6023 UCCAAAGC CUGAUGA X GAA AAGUCUUU	AAAGACUUA GCUUUGGA
	6027 AGGCUCCA CUGAUGA X GAA AGCUAAGU	ACUUAGCUU UGGAGCCU
	6028 UAGGCUC CUGAUGA X GAA AAGCUAAG	CUUAGCUUU GGAGCCUA
25	6036 AACUUUJCA CUGAUGA X GAA AGGCUCCA	UGGAGCCUA UGAAAGUU
	6044 GGCUGAUC CUGAUGA X GAA ACUUUCAU	AUGAAAGUU GAUCAGCC

Where "X" represents stem II region of a HH ribozyme (Hertel et al., 1992 *Nucleic Acids Res.* 20 3252). The length of stem II may be ≥ 2 base-pairs.

Table IX: Mouse *f1t1* VEGF Receptor-Hairpin Ribozyme and Substrate Sequence

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nt.	HP Ribozyme Sequence	Substrate
Position		
5	GUCCAGC AGAA GACCAU ACCAGAGAAAACACAGUUUGGUACAUUACCUGUA	AUGGUCA GCU GCUGGGAC
36	GGUGUCC AGAA GCUGAC ACCAGAGAAAACACAGUUUGGUACAUUACCUGUA	GUCAGCU GCU GGGACACC
50	UAAGGCAA AGAA GCGGUG ACCAGAGAAAACACAGUUUGGUACAUUACCUGUA	CACCGCG GUC UUGCCUUA
67	GACACCCG AGAA GCGCGU ACCAGAGAAAACACAGUUUGGUACAUUACCUGUA	ACGGCU GCU CGGGUGUC
79	CUGUGAGA AGAA GACAC ACCAGAGAAAACACAGUUUGGUACAUUACCUGUA	GGUGUCU GCU UCUCACAG
1066	GAAAGAGA AGAA GGCCUG ACCAGAGAAAACACAGUUUGGUACAUUACCUGUA	CAGGCCA GAC UCUCUTUC
197	CAUGAGUG AGAA GCCUC C ACCAGAGAAAACACAGUUUGGUACAUUACCUGUA	GGAGGCA GCC CACUCUAUG
214	CGGUCCUG AGAA GAGAC C ACCAGAGAAAACACAGUUUGGUACAUUACCUGUA	GGUCUCU GCC CACGACCG
266	CUCCCAC A AGAA GAUGGG ACCAGAGAAAACACAGUUUGGUACAUUACCUGUA	CCCAUCG GCC UGUGGGAG
487	GGAUGAUG AGAA GUCUUC ACCAGAGAAAACACAGUUUGGUACAUUACCUGUA	GAAGACA GCU CAUCAUCC
501	CGUCACCC AGAA GGGAU ACCAGAGAAAACACAGUUUGGUACAUUACCUGUA	AUCCCCU GCC GGGUGACG
566	CUTUGCCC AGAA GGGUA ACCAGAGAAAACACAGUUUGGUACAUUACCUGUA	UACCCCU GAU GGGCAAAG
640	CGCAGUUC AGAA GUCCUA ACCAGAGAAAACACAGUUUGGUACAUUACCUGUA	UAGGACU GCU GAACUGCG
691	GCCGAUGG AGAA GAUAGU ACCAGAGAAAACACAGUUUGGUACAUUACCUGUA	ACUAUCU GAC CCAUCGGC
703	UTUGUAUG AGAA GCCGAU ACCAGAGAAAACACAGUUUGGUACAUUACCUGUA	AUCGGCA GAC CAAUACAA

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736	CUGGGCUC AGAA GCGCUA ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	UACGCCGC GGC GAGCCCAG
754	GCCCCGG AGAA GUCUCA ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	UGAGACU GCU CCACGGGC
766	GGACAAGA AGAA GCCCGU ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	ACGGGCA GAC UCUTUGUCC
871	UCCGGGUCA AGAA GCUGCC ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	GGCAGGG GAU UGACCGGA
5 960	CUCACCGC AGAA GGUGUA ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	UACACCU GUC GCGUGAAG
988	UGUUGAAA AGAA GGAACG ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	CGUTCCA GUC UUUCAACAA
1051	CCUGGCAC AGAA GCUUCC ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	GGAAGCA GGC GGUGCAGG
1081	GCGGAUAG AGAA GUCUUC ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	GAAGACG GUC CUAUCGGC
1090	UCAUGGAC AGAA GAUAGG ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	CCUAUCG GCU GUCCAUGA
10 1093	CUJUCAUG AGAA GCGGAU ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	AUCGGCU GUC CAUGAAAG
1169	AAADAGGG AGAA GACUUC ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	GAAGUCU GCU CGCUAUUU
1315	UUUCGUAG AGAA GAGGU ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	AACCUCGA AU CUACGAAA
1363	UGCGUGCC AGAA GAUAGA ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	UCUAUCC GCU GGGCAGCA
1604	GUCUGAGGA AGAA GCCACC ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	GGUGGU GAC UCUCAGAC
15 1612	UCCAGGG AGAA GAGAGU ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	ACUCUCA GAC CCCUGGAA
1629	GGCCGGC AGAA GUAGAU ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	AUCUACA GCU GCCGGGGC
1632	GAAGGCC AGAA GCUGUA ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	UACAGCU GCC GGGCCUJC
1688	UUCGGCAC AGAA GUGACA ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	UGUCACA GAU GUGCCGAA
1730	UCUCCUUC AGAA GGCAUC ACCAGAGAAACACAGUUGGGUACAUUACCUGGU	GAUGCCA GCC GAAGGAGA

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1753	CCACACAG AGAA GUUUCG ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	UGAAACU GUC CUGUGGG
2017	GGUUUUGA AGAA GGUGUG ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	CACACCU GCU UCAAAACC
2101	ACCAAGUG AGAA GAGGGG ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	CGCCCUCA GAU CACUUGGU
2176	UUUCAAAU AGAA GCGGGC ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	GCACGCU GUU UAUUGAAA
5 2258	GUGAGGUAGAA GCGCUU ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	AAGGGCA GCC UACCUCAC
2305	UGAGCGUG AGAA GCUCCA ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	UGGAGCU GAU CACGCUCA
2383	CGGAAGAA AGAA GCUUCA ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	UGAACCG GUC UUCUUCG
2405	GACAGGUAGAA GUCUUU ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	AAAGACA GAC UACCUGUC
2432	GGAACUUC AGAA GGGUCC ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	GGACCCA GAU GAAGUUCC
10 2464	CAUAGGGC AGAA GUUCAC ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	GUGAACG GCU GCCCUAUG
2467	CAUCAUAG AGAA GCCGUU ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	AACGGCU GCC CUAUGAUG
2592	CACAGUCC AGAA GGUGGG ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	CCCACCU GCC GGACUGUG
2596	CAGCCACA AGAA GGCAGG ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	CCUGCCG GAC UGUGGUG
2653	GUUCGGUC AGAA GAGCUU ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	AAGCUCU GAU GACCGAAC
15 2743	CGAUCACC AGAA GAGGCC ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	GGCCUCU GAU GGUGAUCG
2779	GGUAGUUG AGAA GGUUUC ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	GAAACCU GUC CAACUACC
2814	CUUGUUGA AGAA GAAUAA ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	UUUUUCU GUC UCAACAAG
2831	AUAUGCAA AGAA GCGUCC ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	GGACGCCA GCC UUGCAUAU
2895	ACUGUCUA AGAA GGGCUU ACCAGAGAACACACAGGUUGGUACAUUACCUGGUUA	AAGCCCC GCC UAGACAGU

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2913	GACACUTUG AGAA	GCUGAC ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	GUCAGCA GCU CAAGUGUC	
2928	GAAGCUGG AGAA	GGUGAC ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	GUCACCA GCU CCAGCUUC	
2934	UUCAGGGG AGAA	GGAGCU ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	AGCUCCA GCU UCCUGGAA	
3001	UGGUGAGG AGAA	GUUJUGG ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	CCAAGCA GCC CCUCACCA	
5	3022	UGUAGGAA AGAA	GGUCUU ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	AAGACCU GAU UUCCUACCA
3033	CACUUGGA AGAA	GUAGGA ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	UCCUACA GUU UCCAAUGUG	
3064	UUCUGGAG AGAA	GAAACU ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	AGUUUCU GUC CUCCAGGAA	
3179	CUCACAUU AGAA	GGGUUC ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	GAACCCU GAU UAUGUGAG	
3357	CUUCAGGC AGAA	GCAGAA ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	UUCUGCA GCC GCCUGAAG	
10	3360	UUCUUCUA AGAA	GGUGCA ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	UGCAGGC GCC UGAAGGAA
3379	GGGUUCUC AGAA	GCAUGC ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	GCAUGCG GAU GAGAACCC	
3463	GUUCAGCA AGAA	GGGCC ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	GGCCCCG GUU UGGUGAAC	
3496	UGGUUUGA AGAA	GGUCAC ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	GUGACCU GCU UCAAGCCA	
3553	UGUUTUCUA AGAA	GUAUUGG ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	CCAUCU GAC UGAAACCA	
15	3615	AUCUGCAA AGAA	GUCCUU ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	AAGGACG GCU UGGAGAU
3623	AAAUGUGG AGAA	GCAAAG ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	CUTUGCA GAU CCACAUUU	
3650	CUCACAUU AGAA	GAGCUU ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	AAGCUCU GAU GAUGUGAG	
3754	UAGUGUC AGAA	GAUAGU ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	ACUAUCA GCU GGACACUA	
3772	GGGAGCCC AGAA	GAGUGC ACCAGAGAACACACACGUTUGGGUACAUUACCUGGU	GCACUCU GCU GGGCUCCC	

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3796	UCCAGGGUG AGAA GCUUCA ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	UGAAGCGG GUU CACCUGGA
3881	CUCGGCAG AGAA GAAAGU ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	ACUUUCC GAU CUGCCGAG
3886	UGGGCCUC AGAA GAUCGG ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	CCGAUCU GCC GAGGCCCA
3897	GAAGGCAGA AGAA GGGCCU ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	AGGCCCA GCU UCUGCUUC
5 3903	GCUGGGAGA AGAA GAAGCU ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	AGCUTUCU GCU UCUCGAGC
3912	GUGGCCAC AGAA GGAGAA ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	UUCUCA GCU GUGGCCAC
3969	UGGAGAAC AGAA GGACUC ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	GAGUCU GCU GUUCUCUA
3972	GGUGGGAG AGAA GCAGGA ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	UCCUGCU GTU CUCCACCC
3986	GAGUUGUA AGAA GGGGGU ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	ACCCCCA GAC UACAACUC
10 4018	UUUAGGGG AGAA GGGAGG ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	CCUCCCCC GCC CGCCUAAA
4022	AAGCUUUA AGAA GGCGGG ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	CCCGCCC GCC UAAAGCTU
4040	GUUGUGGG AGAA GGUGAG ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	CUCACCA GCC CCGACAAAC
4053	CUGUCAGG AGAA GGUTUGU ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	ACAACCA GCC CCUGACAG
4095	UCCUGUGG AGAA GAAUAG ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	CUAUCC GCU CCACAGGA
15 4110	CGAAAAGC AGAA GGCUCC ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	GGAGCCA GCU GCUUUUGC
4113	UCACGAAA AGAA GGUGGG ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	GCCAGCU GCU UTUCGUGA
4168	UUAGUCAA AGAA GCAACA ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	UGUUGCU GUU UUGACUAA
4290	GGUGGGCG AGAA GUCCGC ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	GGCGACC GCC CGCCCAAC
4294	GGCCGGUG AGAA GGCGGU ACCAGAGAAAACACAGUUUGGUUACAUUACCUUGUA	ACCGCCC GCC CACCGCCC

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4329	AGUCCAC AGAA GCAGGG ACCAGAAAACACACGUGGUACAUACCUGGUAA	CCCUGCA GCU GUGGGACU
4378	CAGAGCAG AGAA GUCCAU ACCAGAGAAAACACACGUGGUACAUACCUGGUAA	AUGCACU GAC CUGGUUCUG
4383	AGAGACAG AGAA GGUCAG ACCAGAGAAAACACACGUTGGGUACAUACCUGGUAA	CUGACU GCU CUGUCUCU
4388	AUAAGAGA AGAA GAGCAG ACCAGAGAAAACACACGUGGUACAUACCUGGUAA	CUGUCU GUC UCUCUUAU
5 4457	CUCCACAG AGAA GAGGCA ACCAGAGAAAACACACGUTGGGUACAUACCUGGUAA	UGCGUCC GUC CUGUGGAG
4525	CCCGAAC AGAA GAGGCC ACCAGAGAAAACACACGUGGUACAUACCUGGUAA	GGCCUCC GCU GUUUCGGG
4528	GGGCGGA AGAA GCGGAG ACCAGAGAAAACACACGUTGGGUACAUACCUGGUAA	CUCCGCU GUU UCGGGCCC
4643	AAACAGAC AGAA GAAGAC ACCAGAGAAAACACACGUTGGGUACAUACCUGGUAA	GUCUTUCU GUU GUCUGUUU
4650	GGAUUGUA AGAA GACAAC ACCAGAGAAAACACACGUGGUACAUACCUGGUAA	GUUGUCU GUU UACCAUCC
10 4724	ACUAGAGG AGAA GAUGAU ACCAGAGAAAACACACGUGGUACAUACCUGGUAA	AUCAUCA GUU CCUCUAGU
4771	AUGCGAAG AGAA GGCCUG ACCAGAGAAAACACACGUGGUACAUACCUGGUAA	CAGGCCU GAC CUUCGCAU
4785	UCCCCGUG AGAA GUAUUC ACCAGAGAAAACACACGUGGUACAUACCUGGUAA	GCAUACU GCU CACGGGGA
4809	CUAGGCCA AGAA GGACCA ACCAGAGAAAACACACGUGGUACAUACCUGGUAA	UGGUCCA GUU UGGCCUAG
4834	UUGAGCCC AGAA GUAGGC ACCAGAGAAAACACACGUGGUACAUACCUGGUAA	GCCUACU GAU GGGCUCAA
15 4912	AUAAUAAA AGAA GGAAUAA ACCAGAGAAAACACACGUGGUACAUACCUGGUAA	UUAUCCU GUU UUAUAUAU
5119	UCCUCUCA AGAA GCCUUG ACCAGAGAAAACACACGUGGUACAUACCUGGUAA	CAAGGCA GUC UGAGAGGA
5144	UAAAUAUG AGAA GAUACU ACCAGAGAAAACACACGUGGUACAUACCUGGUAA	AGUAUCA GCC CAUAUTUA
5287	AGGUUAUG AGAA GAUGAA ACCAGAGAAAACACACGUGGUACAUACCUGGUAA	UUCAUCU GUU UCAUACCU
5363	CCCCAAAG AGAA GGCAAC ACCAGAGAAAACACACGUGGUACAUACCUGGUAA	GGUGGCC GCU CUUUGGG

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5462	CCGGCUCC AGAA GGUGUG ACCAGAGAAAACACACCGUUGGUACAUUACCUGGU	CACACCU GCC GGAGCCGG
5478	GUCUGCCC AGAA GUGACC ACCAGAGAAAACACACCGUUGGUACAUUACCUGGU	GGUCACCA GCU GGGCAGAC
5486	UAUUCAU C AGAA GCCCAG ACCAGAGAAAACACACCGUUGGUACAUUACCUGGU	CUGGGCA GAC GAUGAAUA
5500	UCUCCCCA AGAA GCUAU ACCAGAGAAAACACACCGUUGGUACAUUACCUGGU	AAUAGCU GCU UUGGGAGA
5 5539	CUGGCCCC AGAA GAGAAU ACCAGAGAAAACACACCGUUGGUACAUUACCUGGU	AUUCUCU GAC CGGGCCAG
5564	CACAGGGG AGAA GGUAC ACCAGAGAAAACACACCGUUGGUACAUUACCUGGU	GGUACCU GCU CCCUGUG
5597	UCUCAUCA AGAA GAAAAC ACCAGAGAAAACACACCGUUGGUACAUUACCUGGU	GUUUUCU GUC UGAUGAGA
5601	CCAGUCUC AGAA GACAGA ACCAGAGAAAACACACCGUUGGUACAUUACCUGGU	UCUGUCU GAU GAGACUGG
5639	GGGCUGCA AGAA GUCUCA ACCAGAGAAAACACACCGUUGGUACAUUACCUGGU	UGAGACA GCC UGCAGCCC
10 5645	CCACAGGU AGAA GCAGGC ACCAGAGAAAACACACCGUUGGUACAUUACCUGGU	GGCUGCA GCC CACUGUGG
5781	CACACUGC AGAA GACAAG ACCAGAGAAAACACACCGUUGGUACAUUACCUGGU	CUUGUGG GCU GCAGUGUG
5829	CUGUUUC AGAA GUUUUC ACCAGAGAAAACACACCGUUGGUACAUUACCUGGU	AGAAAACG GAU GAGAACAG
5842	AAACCUCA AGAA GCUGUU ACCAGAGAAAACACACCGUUGGUACAUUACCUGGU	AACAGCA GCC UGAGGUUU
5915	UUAUUAAA AGAA GAAUAA ACCAGAGAAAACACACCGUUGGUACAUUACCUGGU	UUAUUCC GAU UUUAAUAA
15 6010	AGUCUUUA AGAA GAACCA ACCAGAGAAAACACACCGUUGGUACAUUACCUGGU	UGGUUCU GCU UAAAGACU

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Table X: Homologous Hammerhead Ribozyme Target Sites
Between Human flt-1 and KDR RNA

	nt. Posi- tion	flt-1 Target Sequence	nt. Posi- tion	KDR Target Sequence
5	3388	CCGGGAU A UUUAUAA	3151	CCGGGAU A UUUAUAA
	2174	AAUGUAU A CACAGGG	3069	AgUGUAU c CACAGGG
	2990	UGCAAAU A UGGAAAU	2756	UGCAAAU u UGGAAAc
	2693	CUCCCUU A UGAUGCC	2459	CUGCCUU A UGAUGCC
10	2981	GUUGAAU A CUGCAAA	2747	GUgGAAU u CUGCAAA
	1359	UAUGGUU A AAAGAUG	2097	UgUGGUU u AAAGAUa
	3390	GGGAUAU U UAUAAAGA	3153	GGGAUAU U UAUAAag
	3391	GGAUAUU U AUAAAGAA	3154	GGAUAUU U AUAAAGa
	2925	ACGUGGU U AACCUUGC	2691	AuGUGGU c AACCUuC
15	7140	UAUUUCU A GUCAUGA	2340	UAcUUUCU u GUCAUcA
	1785	CAAUAAU A GAAGGAA	1515	CucUAAU u GAAGGAA
	2731	GAGACUU A AACUGGG	768	uuGACUU c AACUGGG
	3974	GAUGACU A CCAGGGC	1466	GAgGACU u CCAGGGa
	6590	UUAAUGU A GAAAGAA	2603	aaAAUGU u GAAAGAA
20	6705	GCCAUUU A UGACAAA	3227	aCaAUUU u UGACAgA
	974	GUCAAAU U ACUUAGA	147	uUCAAAU U ACUUGcA
	1872	AUAAAAGU U GGGACUG	1602	AcAAAAGU c GGGAgAG
	2333	ACUJUGGU U UAAAAAC	1088	AaaUGGU a UAAAAAAu
	2775	AAGUGGU U CAAGCAU	1745	AcaUGGU a CAAGCuU
25	3533	UUCUCCU U AGGUGGG	3296	UUuUCCU U AGGUGcu
	3534	UCUCCUU A GGUGGGU	3297	UuUCCUU A GGUGcuU
	3625	GUACUCU A CUCCUGA	4054	GagCUCU c CUCCUGu
	1814	AGCACCU U GGUUGUG	1059	AGuACCU U GGUUacc
	2744	GGCAAAU C ACUUGGA	147	uuCAAAU u ACUUGcA
30	2783	CAAGCAU C AGCAUUU	796	gAAGCAU C AGCAUaa

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3613	GAGAGCU C CUGAGUA	2968	GgaAGCU C CUGAagA
4052	AAGGCCU C GCUCAAG	1923	ucuGCCU u GCUCAAG
5305	UCUCCAU A UCAAAAC	456	ggUCCAU u UCAAAuC
7158	AUGUAUU U UGUAUAC	631	gUcUAUU a UGUAcAu
5 1836	CUAGAAU U UCUGGAA	1007	aUgGAAU c UCUGGug
2565	CUCUCUU C UGGCUCC	2328	uguUCUU C UGGCUaC
4250	CUGUACU C CACCCCA	3388	uUaUACU a CACCagA
7124	ACAUGGU U UGGUCCU	3778	cagUGGU a UGGUuCU
436	AUGGUCU U UGCCUGA	1337	AcGGUCU a UGCCauu
10 2234	GCACCAU A CCUCCUG	1344	augCCAU u CCUCCcc
2763	GGGCUUU U GGAAAAG	990	uuGCUUU U GGAAguG
4229	CCAGACU A CAACUCG	767	auuGACU u CAACUgG
5301	GUUUUCU C CAUAUCA	3307	ugcUUUCU C CAUAUCC
6015	AGAAUGU A UGCCUCU	1917	AcuAUGU c UGCCUug
15 6095	AUUCCCU A GUGAGCC	1438	AUaCCCU u GUGAaga
6236	UGUJGUU C CUCUUCU	76	UagUGUU u CUCUUga
5962	GCUUCCU U UUAUCCA	3099	auaUCCU c UUAUCgg
7629	UAUUAU U CUCUGCU	3096	gAaAUAU c CUCUuaU

Lowercase letters are used to represent sequence variance
 20 between flt-1 and KDR RNA

Table XI: 2.5 μmol RNA Synthesis Cycle

Reagent	Equivalents	Amount	Wait Time*
Phosphoramidites	6.5	163μL	2.5
S-Ethyl Tetrazole	23.8	238μL	2.5
5 Acetic Anhydride	100	233 μL	5 sec
N-Methyl Imidazole	186	233 μL	5 sec
TCA	83.2	1.73 mL	21 sec
Iodine	8.0	1.18 mL	45 sec
Acetonitrile	NA	6.67 mL	NA

Claims

1. Nucleic acid molecule which modulates the synthesis, expression and/or stability of an mRNA encoding one or more receptors of vascular endothelial growth factor.
2. The nucleic acid of claim 1, wherein said receptor is flt-1, KDR and/or flk-1.
3. The nucleic acid of claim 1 or 2, wherein said molecule is an enzymatic nucleic acid molecule.
- 10 4. The nucleic acid molecule of claim 3, wherein, the binding arms of said enzymatic nucleic acid contain sequences complementary to the substrate nucleotide base sequences in any one of Tables II to IX.
- 15 5. The nucleic acid molecule of claims 3 or 4, wherein said nucleic acid molecule is in a hammerhead motif.
- 20 6. The enzymatic nucleic acid molecule of claim 3 or 4, wherein said nucleic acid molecule is in a hairpin, hepatitis Delta virus, group I intron, VS nucleic acid or RNaseP nucleic acid motif.
7. The enzymatic nucleic acid molecule of any of claims 3 or 4, wherein said ribozyme comprises between 12 and 100 bases complementary to the RNA of said region.
- 25 8. The enzymatic nucleic acid of claim 7, wherein said ribozyme comprises between 14 and 24 bases complementary to the RNA of said region.
9. Enzymatic nucleic acid molecule consisting essentially of any ribozyme sequence selected from those shown in Tables II to IX.

10. A mammalian cell including a nucleic acid molecule of any of claims 1, 2 or 3.

11. The cell of claim 10, wherein said cell is a human cell.

5 12. An expression vector comprising nucleic acid encoding the nucleic acid molecule of any of claims 1, 2, 3 or 4, in a manner which allows expression and/or delivery of that RNA molecule within a mammalian cell.

13. The expression vector of claim 12, wherein said 10 nucleic acid is an enzymatic nucleic acid.

14. A mammalian cell including an expression vector of any of claims 12 or 13.

15. The cell of claim 14, wherein said cell is a human cell.

15 16. A method for treatment of a patient having a condition associated with the level of flt-1, KDR and/or flk-1, wherein the patient, tissue donor or population of corresponding cells is administered a therapeutically effective amount of an enzymatic nucleic acid molecule of 20 claims 1, 2, 3 or 4.

17. A method for treatment of a condition related to the level of flt-1, KDR and/or flk-1 activity by administering to a patient an expression vector of claim 12.

18. The method of claims 16 or 17, wherein said 25 patient is a human.

19. The nucleic acid of claim 1 or 2, wherein said molecule is an antisense nucleic acid molecule.

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20. The nucleic acid molecule of claim 19, wherein, said antisense nucleic acid contain sequences complementary to the substrate nucleotide base sequences in any one of Tables II to IX.

5 21. An expression vector comprising nucleic acid encoding the antisense nucleic acid molecule of any one of claims 19 or 20, in a manner which allows expression and/or delivery of that antisense RNA molecule within a mammalian cell.

10 22. A mammalian cell including an expression vector of claim 21.

23. The cell of claim 22, wherein said cell is a human cell.

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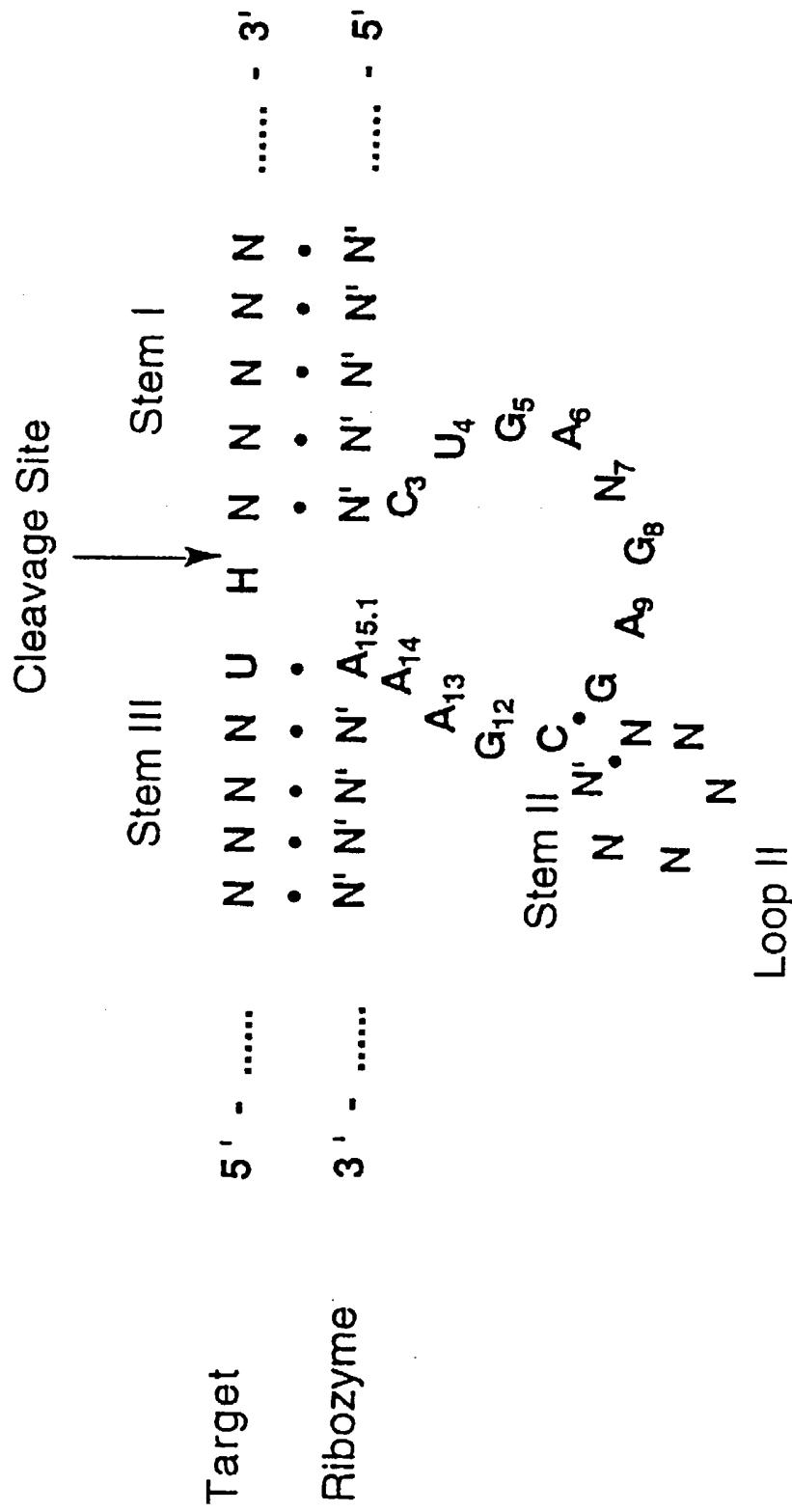


FIG. 1.

FIG. 2a.

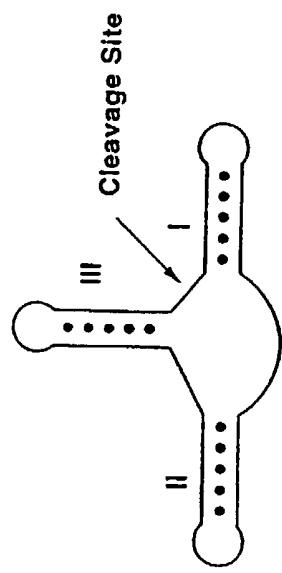


FIG. 2b.

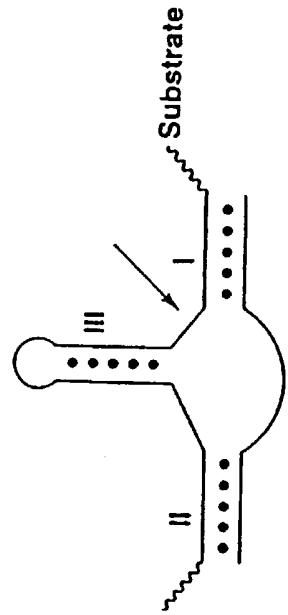


FIG. 2c.

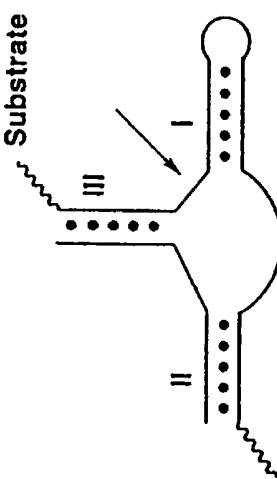
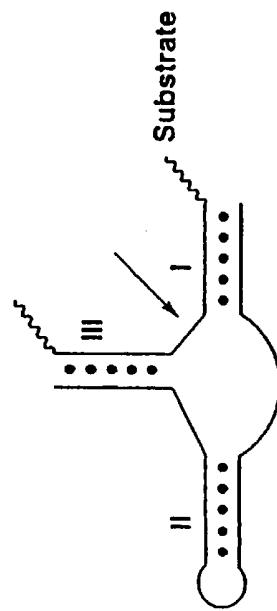


FIG. 2d.

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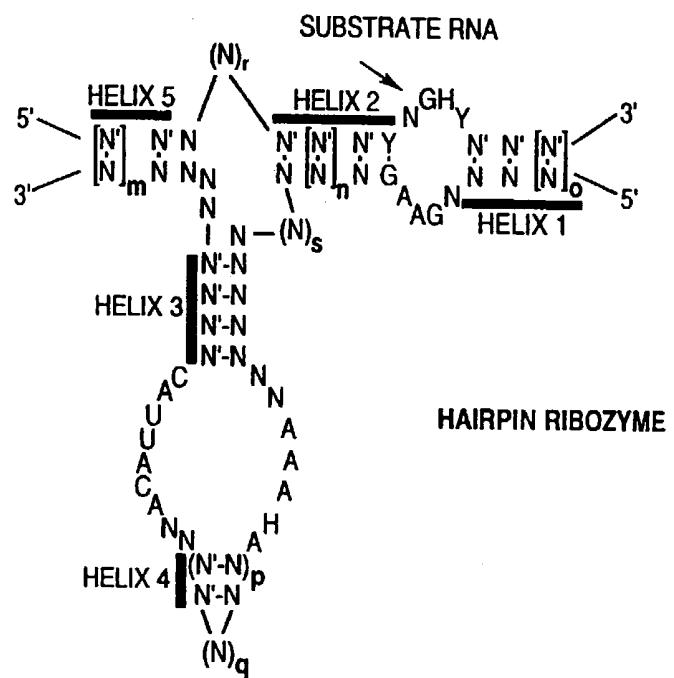
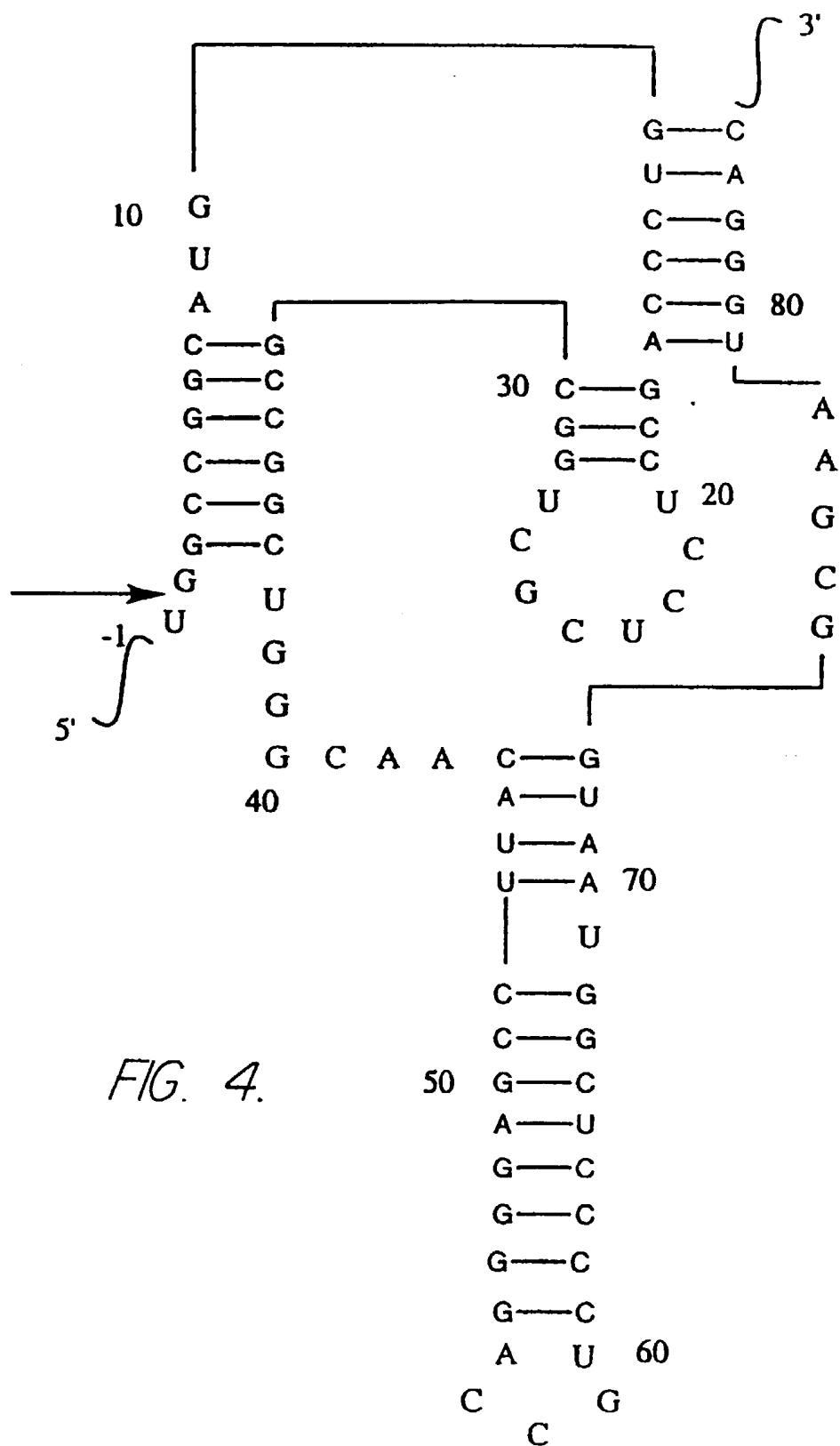


FIG. 3.

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NEUROSPORA VS RNA ENZYME

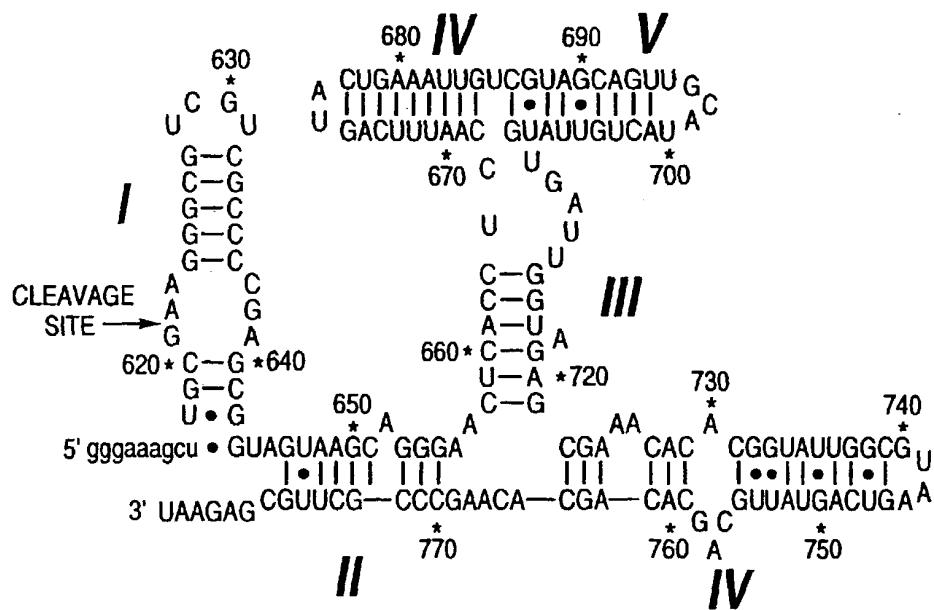


FIG. 5.

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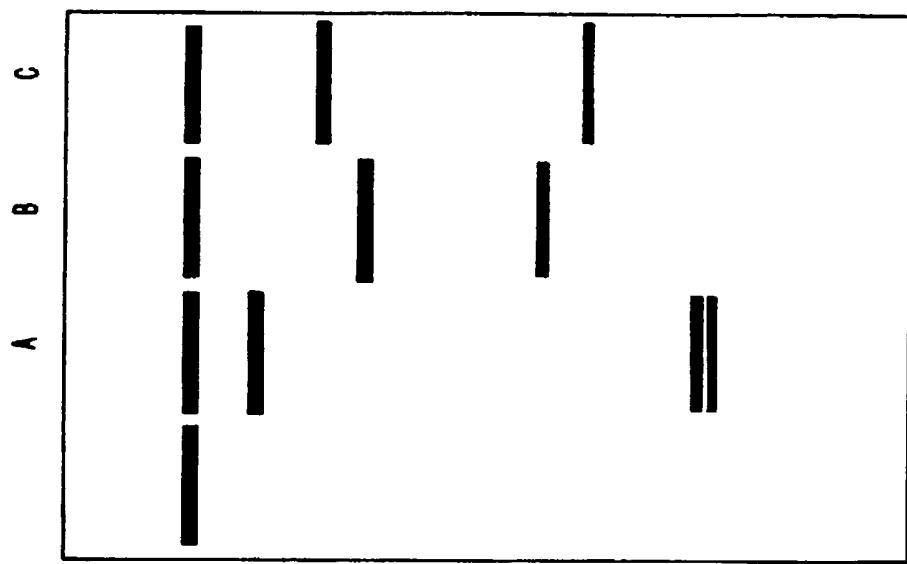
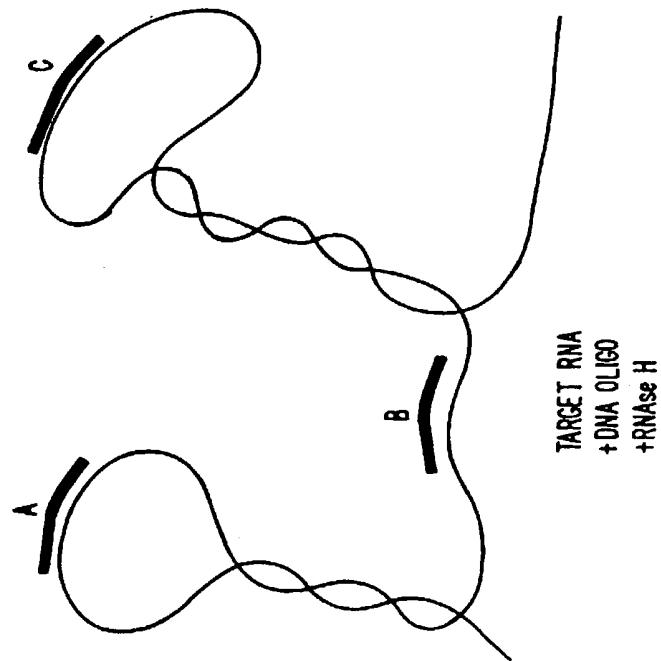
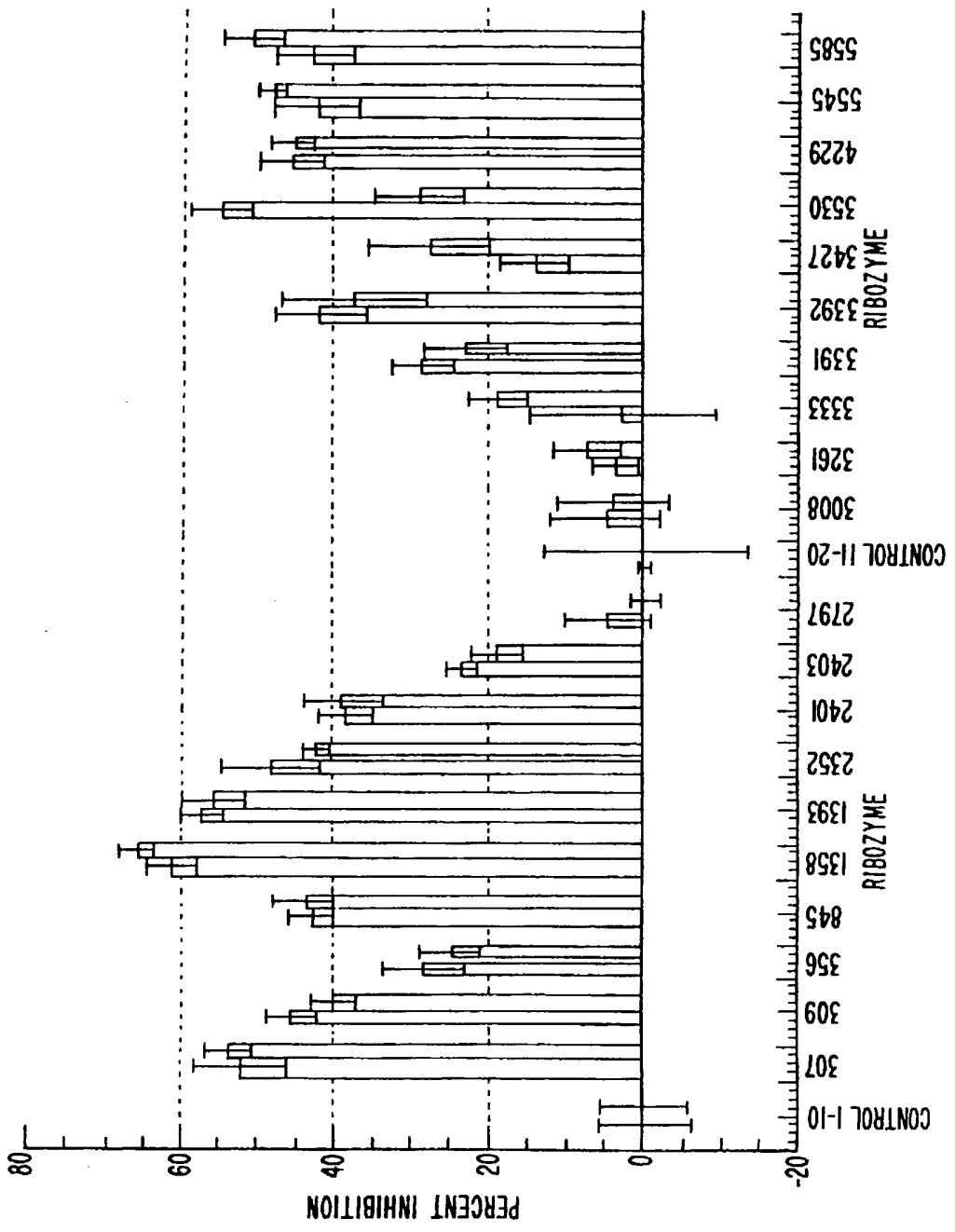


FIG. 6.



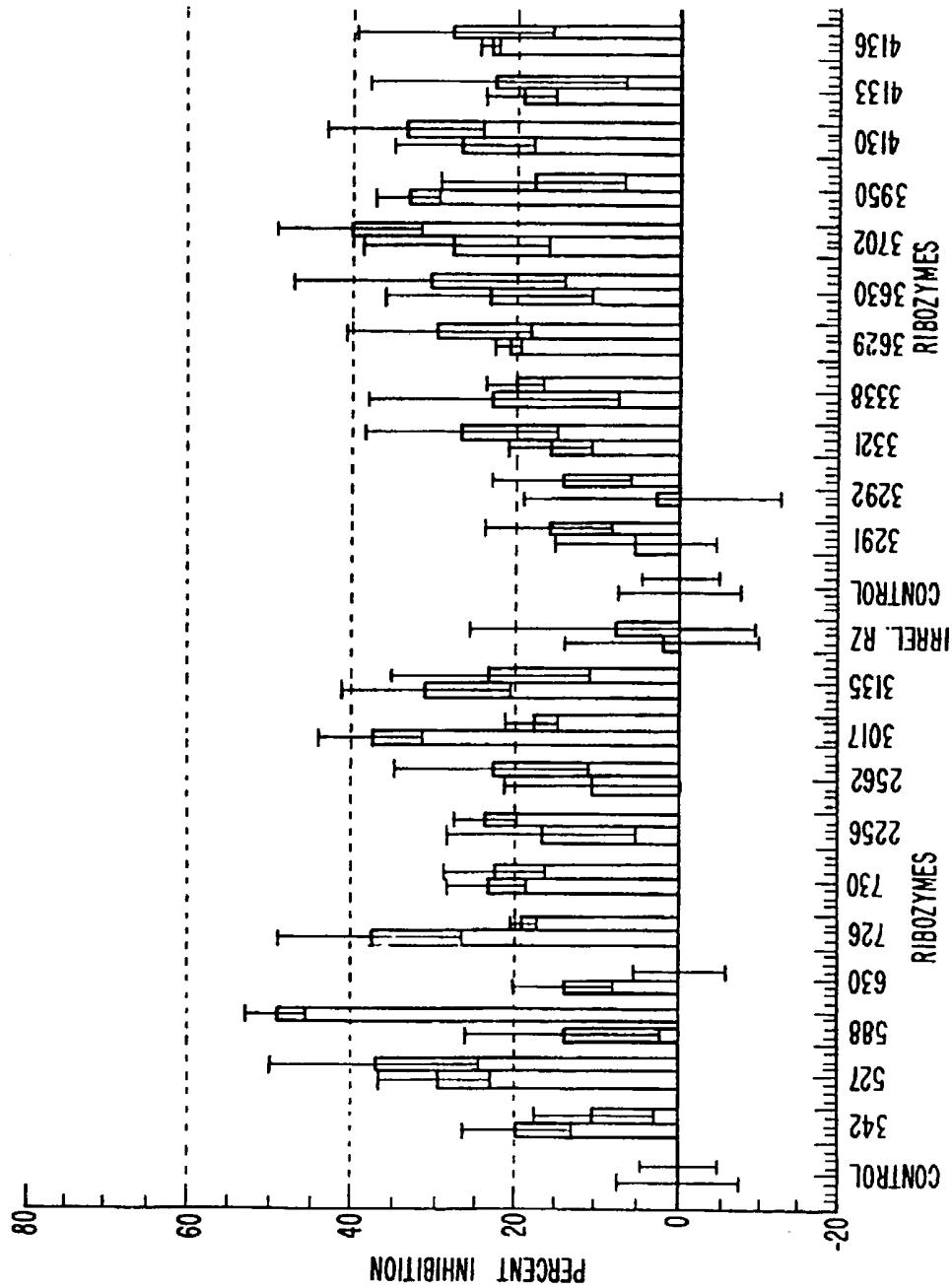
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FIG. 7.



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FIG. 8.



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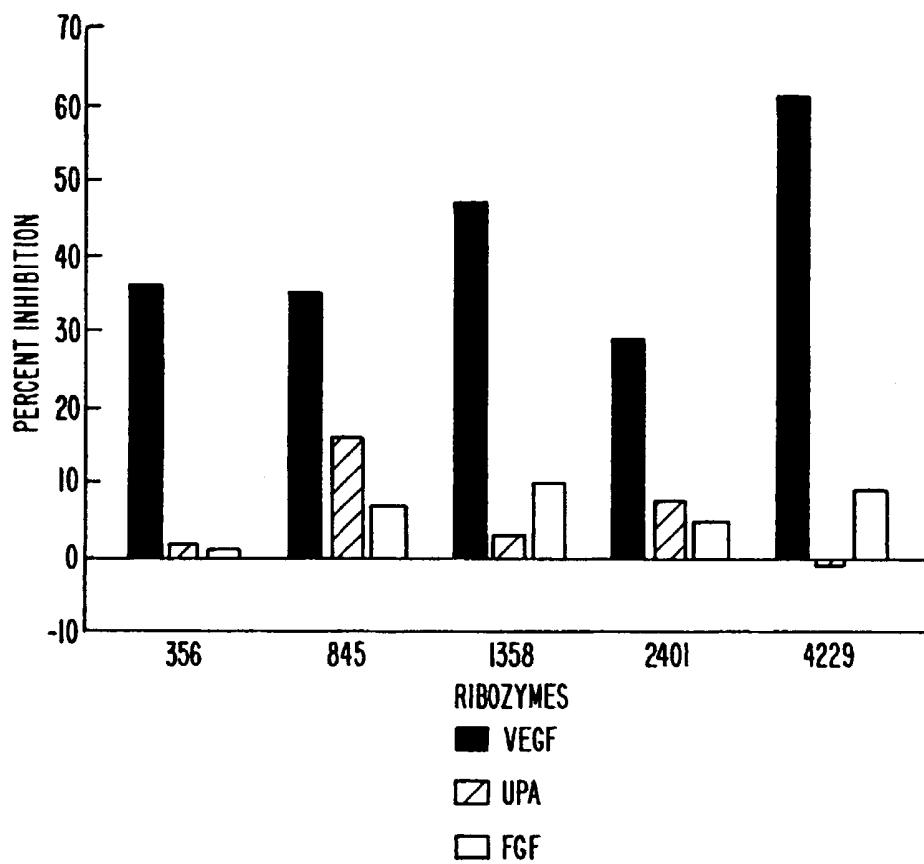
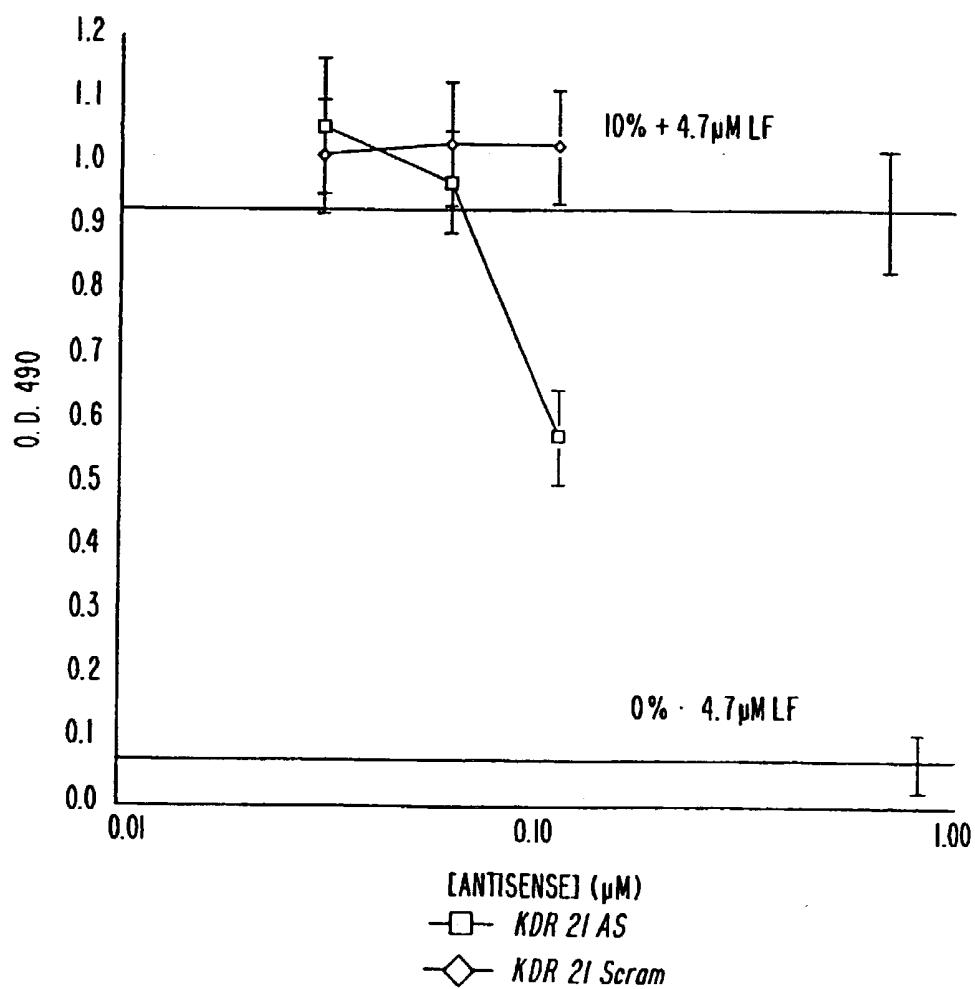


FIG. 9.

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FIG. 10.



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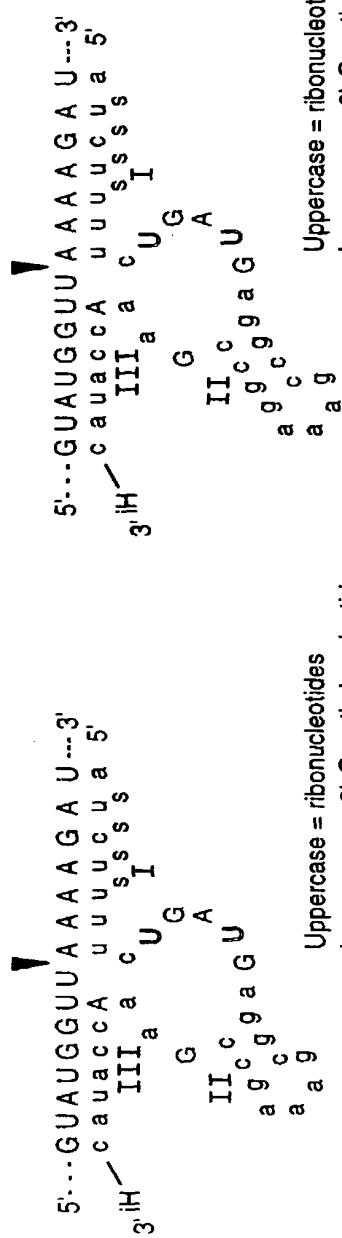
**1358 HH-A Ribozyme****1358 HH-B Ribozyme****4229 HH-B Ribozyme**

FIG. 11A.

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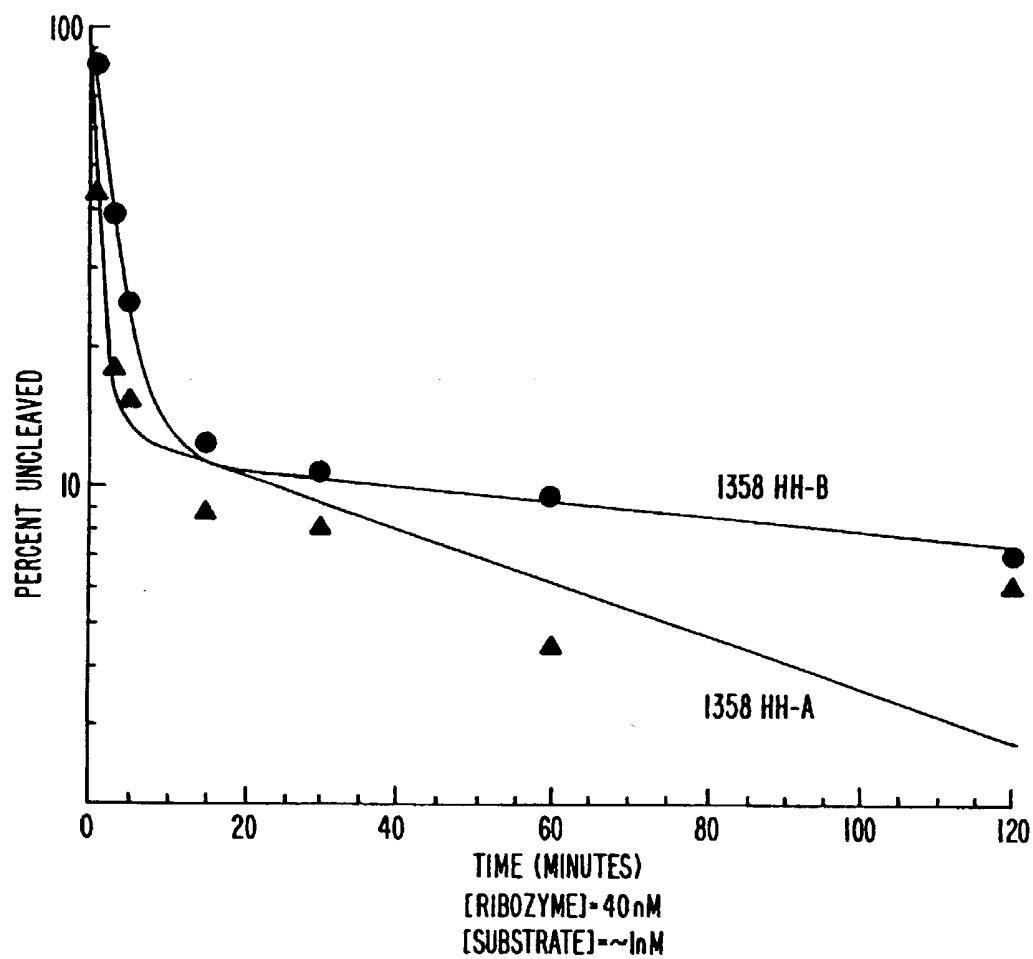
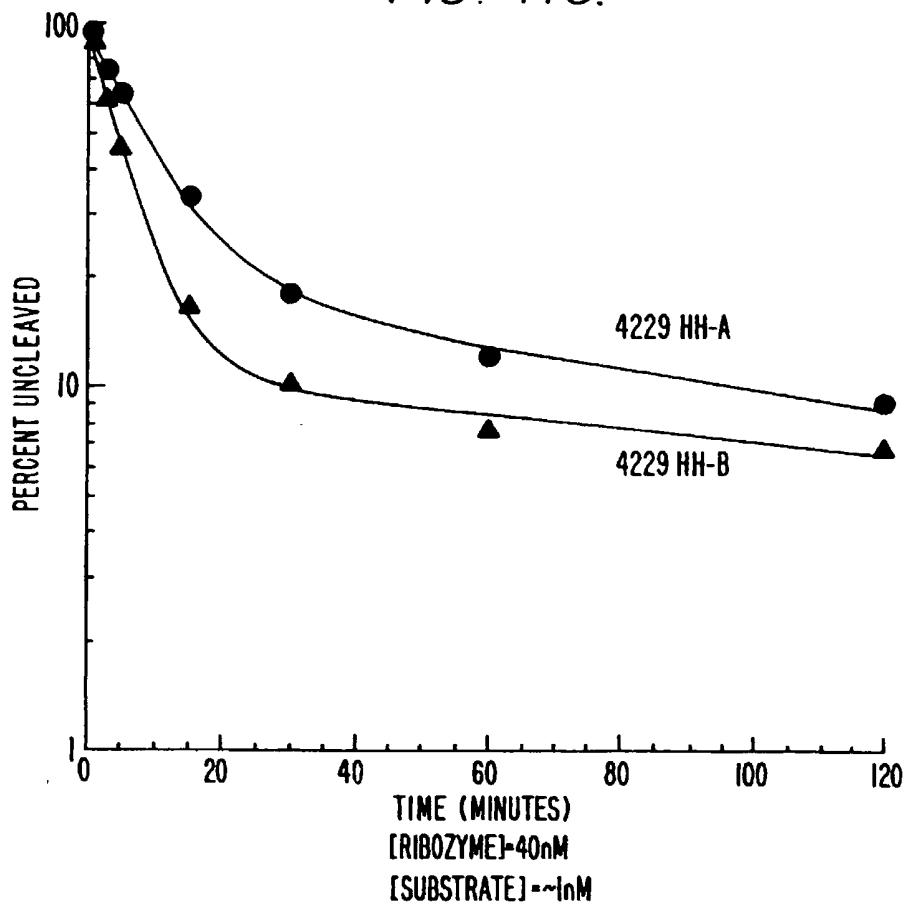


FIG. 11B.

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FIG. 11C.



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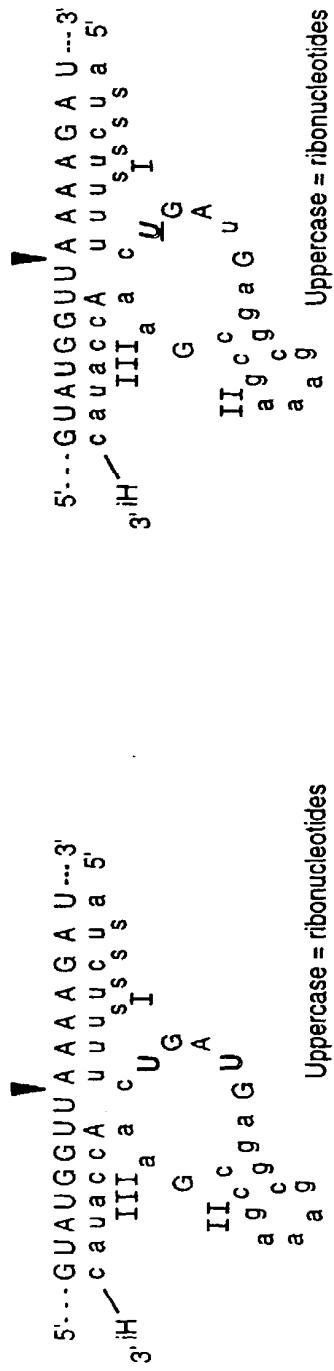
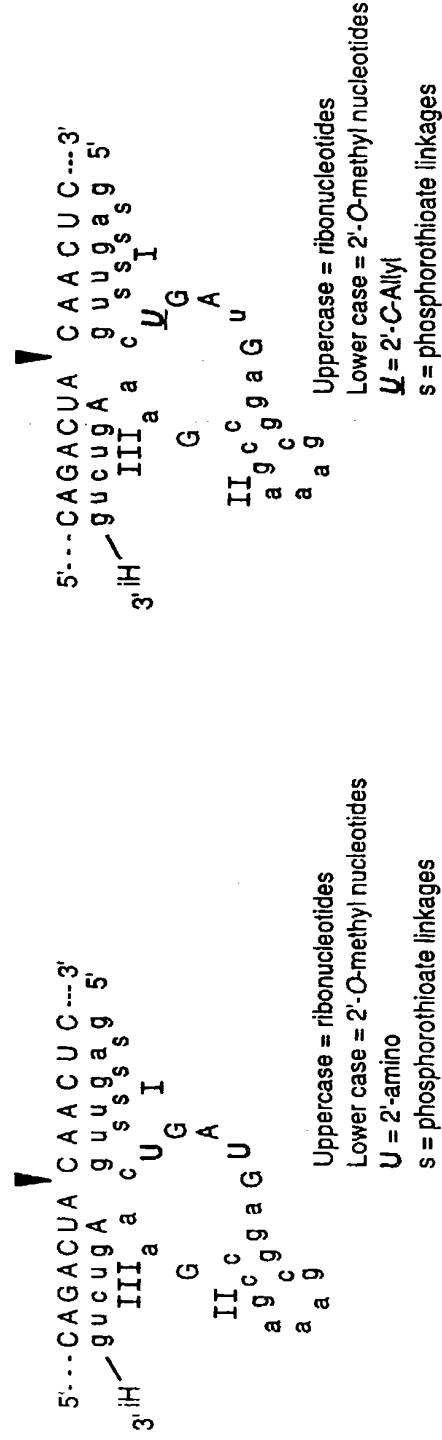
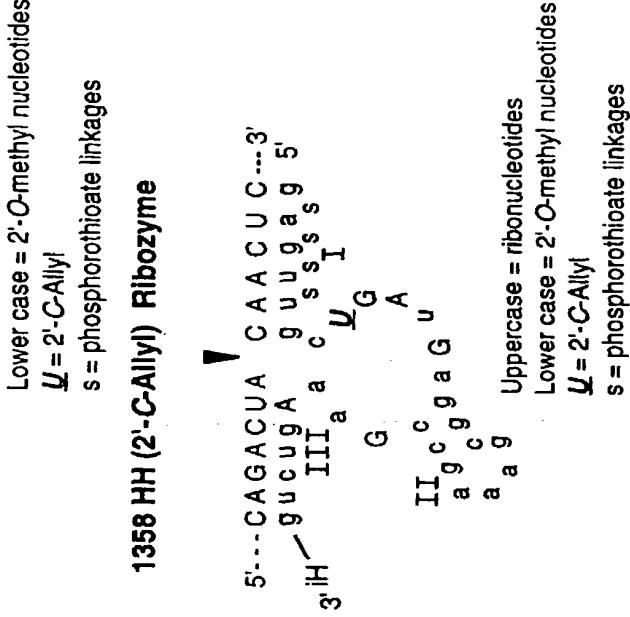
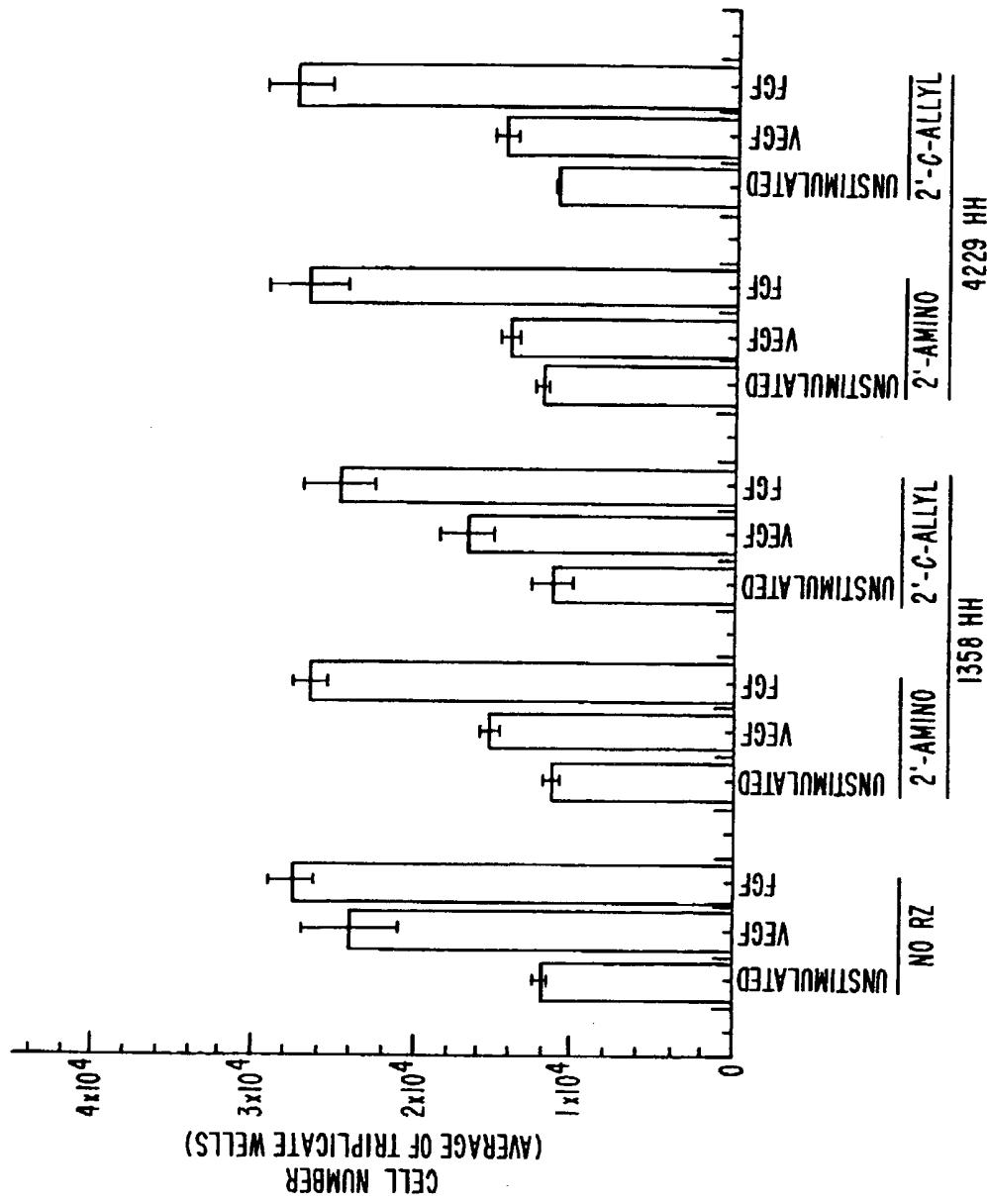
**1358 HH (2'-Amino) Ribozyme****4229 HH (2'-Amino) Ribozyme**

FIG. 12A.

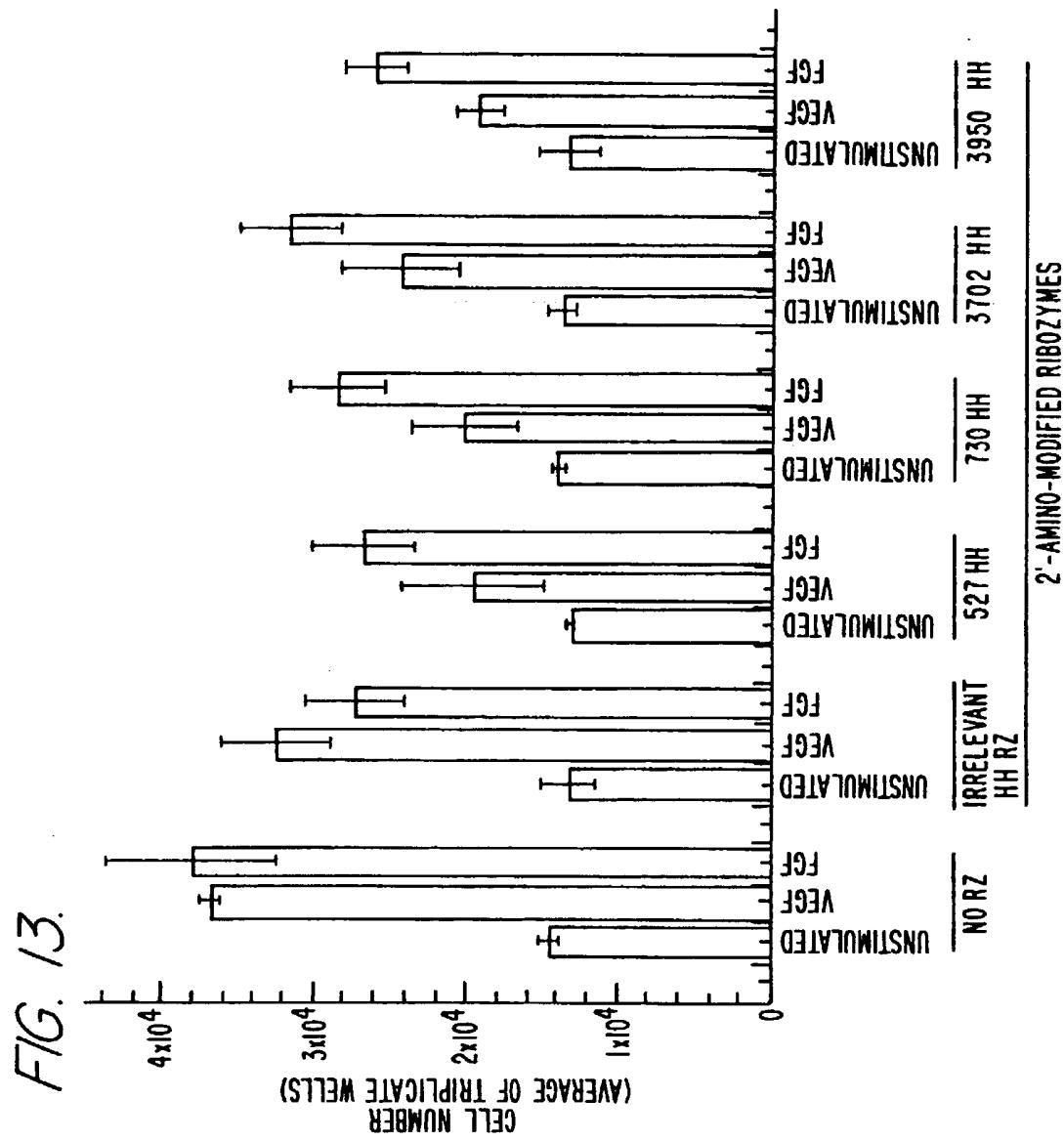
4229 HH (2'-C-Allyl) Ribozyme**1358 HH (2'-C-Allyl) Ribozyme****4229 HH (2'-C-Allyl) Ribozyme**

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FIG. 12B.



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FIG. 14.

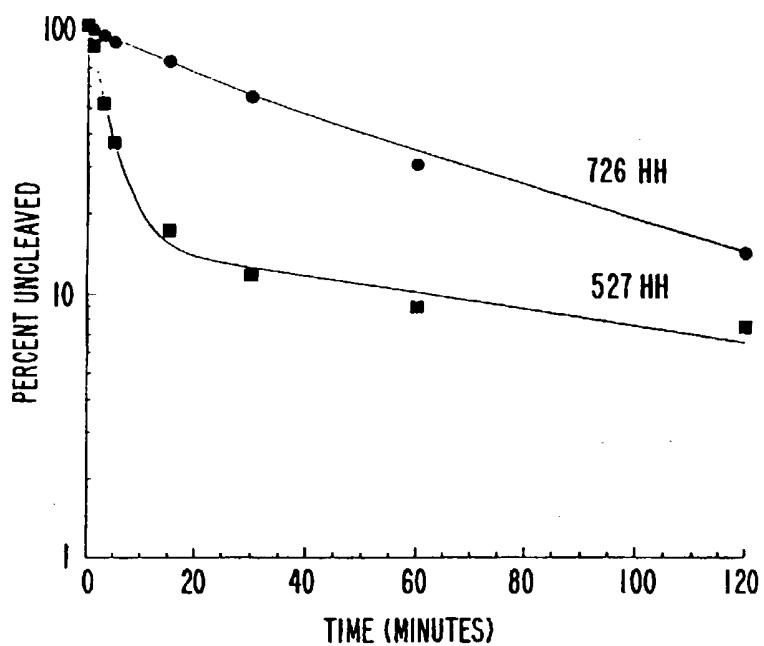
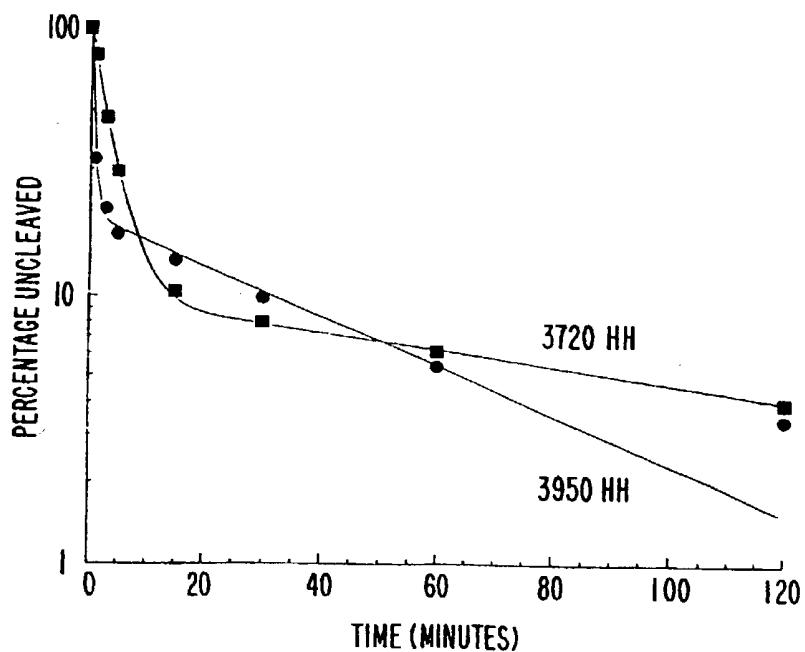
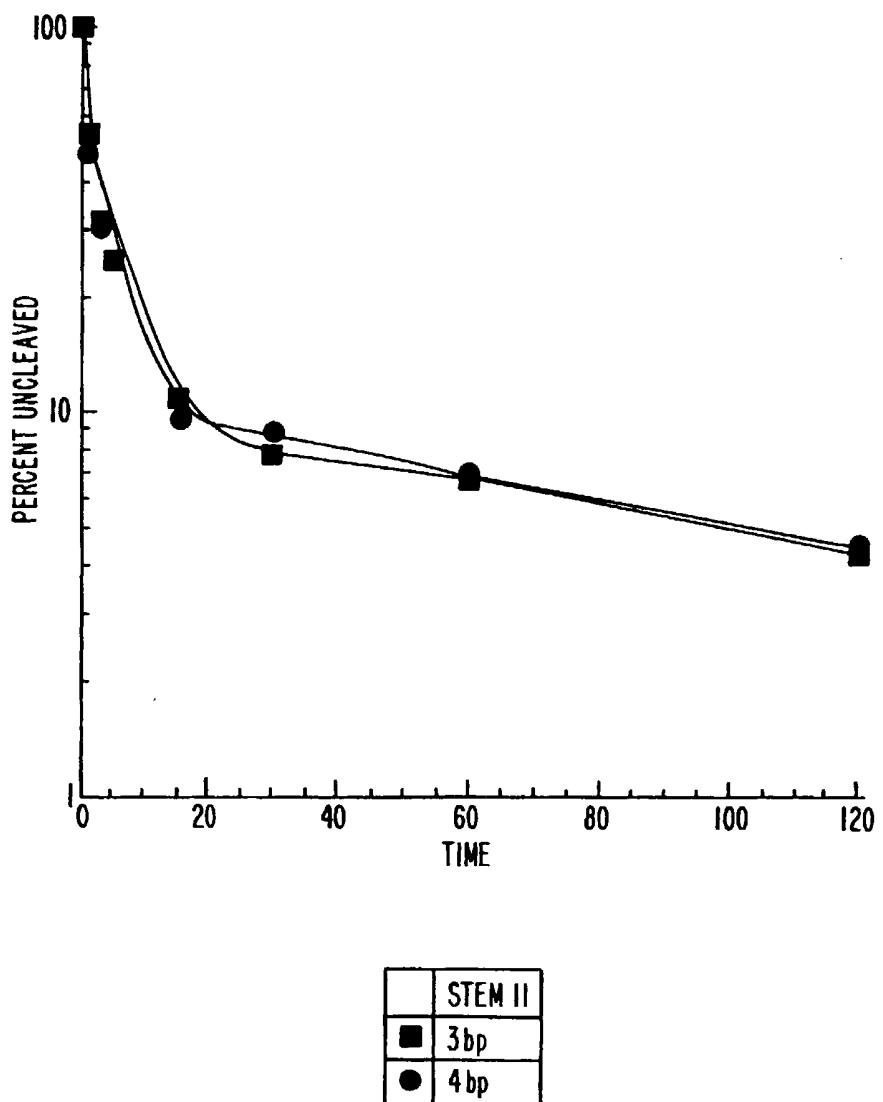


FIG. 15.



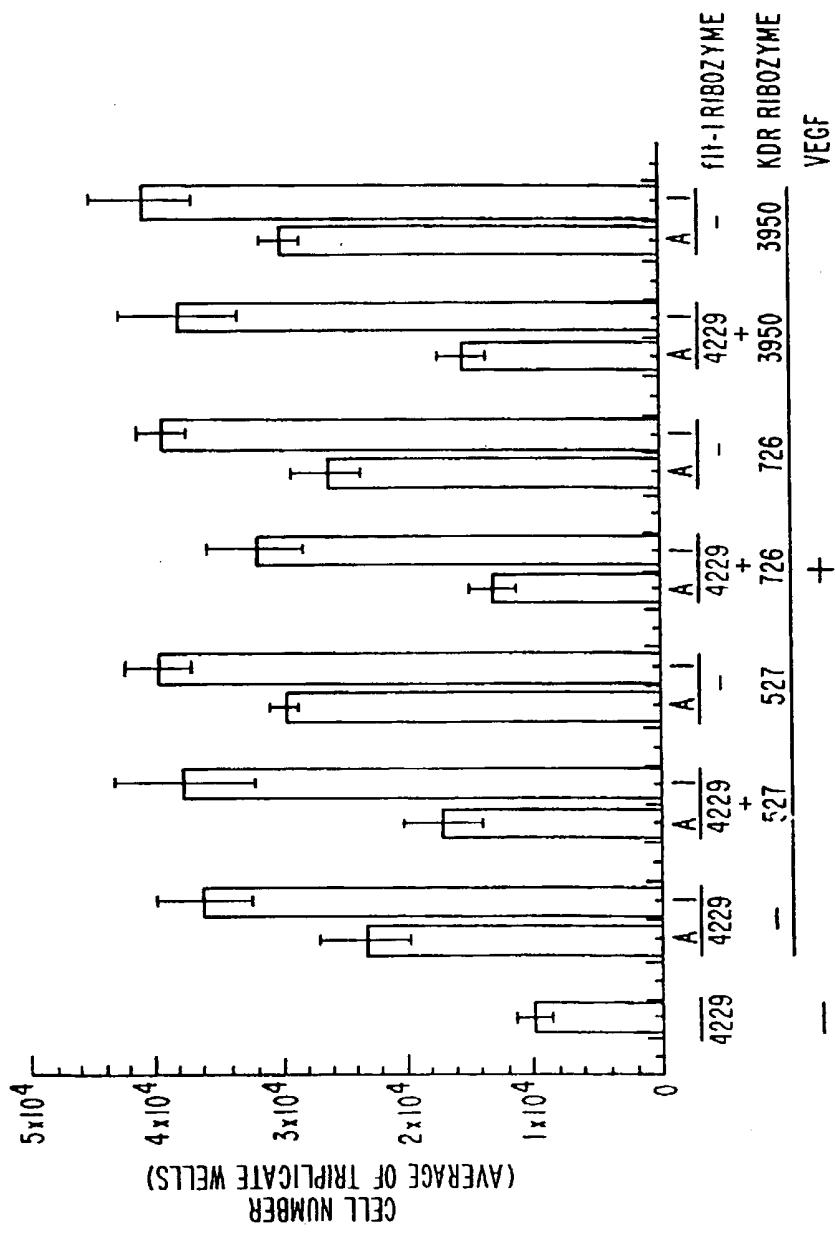
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FIG. 16.



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FIG. 17.



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FIG. 18.

